COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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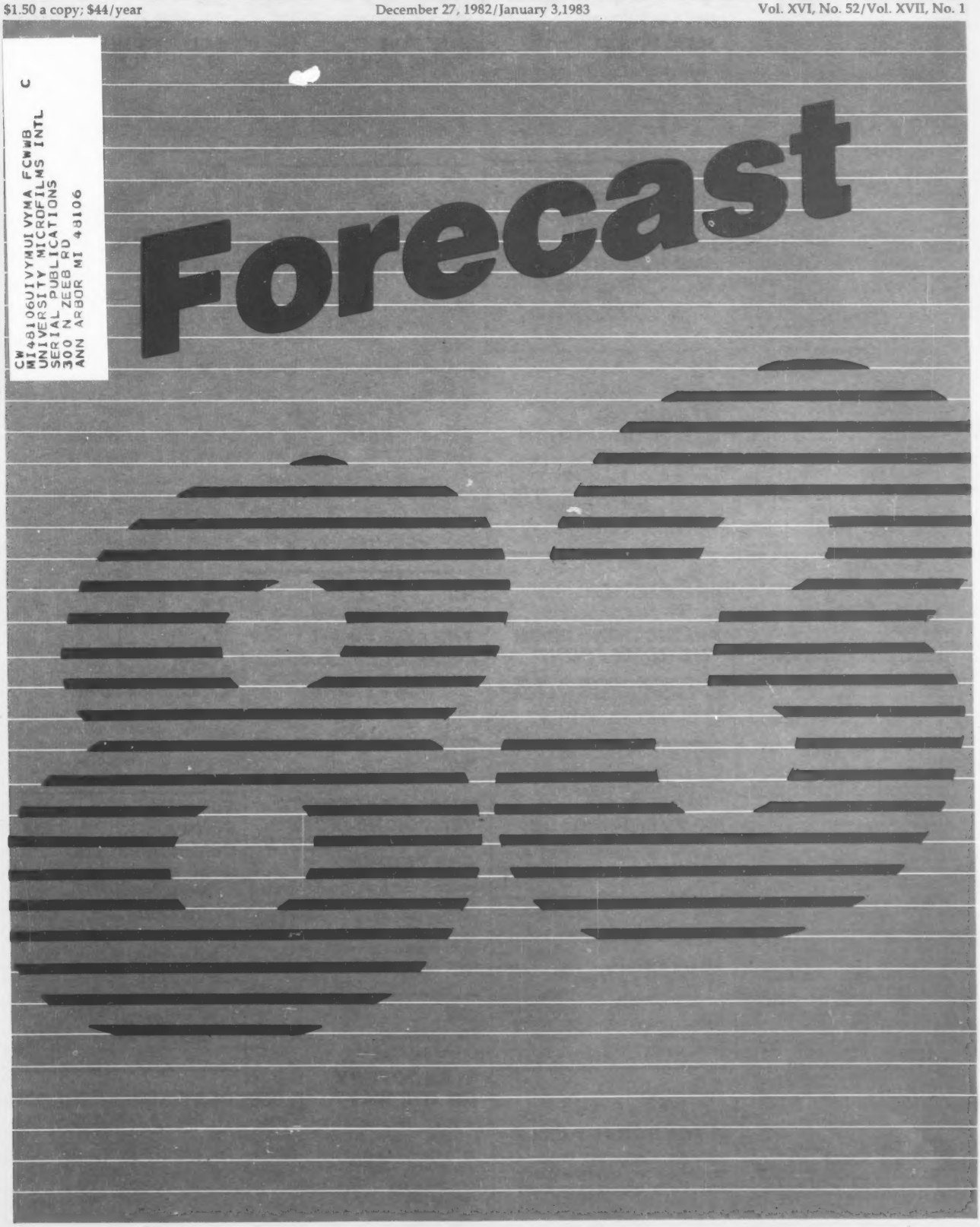

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Next Year's Budgets

Making Do

By Susan Blakeney

Although many U.S. corporations are tightening their belts, most of next year's DP budgets have passed unscathed before watchful corporate eyes.

In fact, the majority of DP installations — 66% — were allowed to let out their 1983 budget belts an average of 17% compared with 1982, *Computerworld* found when it surveyed 50 DP managers from companies of different sizes around the country. Ten percent experienced budget cuts, and 20% said their budgets were the same as last year.

The average DP budget accounts for 2% of a corporation's annual gross revenues, regardless of the company's size, according to the survey.

The survey did uncover some disturbing news: Three companies have had to defer DP projects because of the unfavorable economic climate, two have imposed hiring freezes and one company has filed for Chapter 11 bankruptcy protection. However, while 27 of the 50 DP executives surveyed admitted that the recession has brought belt-tightening in the areas of travel, education and other "extras," 30% said the recession has had no adverse effect at all on their spending habits.

Why are so many DP budgets seemingly recession-proof? Some DP directors suggested that the answer may lie in the fact that ever-increasing demands are being made on DP, coupled with the general belief that it pays to automate most procedures.

"In spite of a depressed economy, we're gearing up for the future of our company," observed John Shields, vice-president of management information systems (MIS) at Flexi-Van Corp., a $200 million lessor of transportation equipment. "The executives are very supportive of MIS, and we've been treated very well — so we can stay competitive for the future."

Next year, salaries will once again consume the lion's share of the DP budget — 46%, up 3.7% from 1982. However, the amount of money budgeted for salaries is up 12.9% from '82, whereas spending for '82 salaries was up 17% from the previous year. Nineteen of the 50 installations canvassed said they asked for the same percent of the corporate coffer to pay salaries as last year; nine expected less because of corporate cutbacks.

Eleven percent of 1983's DP budgets will go for managers working in DP departments. Programmers will account for 12% and systems analysts for 11% of the budget. Data entry workers, computer operators and other support and administrative personnel will claim 6%, 5% and 1%, respectively.

Among those DP executives surveyed, 56% said they will not be hiring additional staff in 1983, except to replace people who leave. Morris Fusco, director of data processing at Publix Shirt Corp. in New York, said his company has imposed a salary and hiring freeze until July 1.

The remaining 44% of the DPers polled said they will be hiring, mainly in the areas of programming and analysis, with a few jobs open for technicians, communications specialists and support personnel. Only one person will be hiring a manager.

Asked if they have any trouble finding qualified DP people, 82% replied in the affirmative. Only half the managers surveyed last year reported similar trouble.

The flip side of this coin, however, contains good news: 62% of the managers said the turnover rate has fallen in the past year. The remaining 38% said there

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Staff Writer Susan Blakeney led the team of Computerworld *writers who conducted the survey upon which the above story is based. The survey team included Jim Bartimo, Robert Batt, Jenny Charlesworth, Paul Gillin and Bruce Hoard.*

has been no change. No one claimed that turnover is increasing.

Turnover or no, 27 of the managers surveyed do not or would not hire people without some kind of DP background. "I have enough problems," Fusco commented.

The other 23 DP directors do hire people without DP experience, but primarily for entry-level spots. People from in-house are the strongest candidates for these jobs ("We give in-house people aptitude tests and look at their job performance history," said one senior vice-president of DP), followed by people with liberal arts degrees and then by people with industry-specific or accounting expertise. Two managers in the survey said they also consider people looking to change fields; four others consider people who have taken some kind of DP course.

Positive Toward Non-DP Types

Asked whether the non-DP types are effective, all the survey participants responded positively. Several said they are extremely effective. "I think people have a tendency to reward you when you give them a chance at something new," one DP manager observed.

The average amount of money allocated for training next year is 1.7% of the DP budget, although 23 of the 50 DP managers polled will spend less than 1% on training. Last year's budget survey found that managers would be spending 2.6% in 1982.

Programmers average as much time on maintenance as on development work, according to *Computerworld's* survey. However, the gamut runs from 90% of time spent for systems maintenance to 90% for system development. This is close to last year's finding.

Software Expenditures

Application software will cost DP managers about 5.4% of the 1983 DP budget, the survey found. Fourteen of the DP managers surveyed said this figure is up from last year, with increases from 2% to 150%.

Eighteen DPers said the figure represents no change from the previous year, while four projected decreased application software costs for 1983.

Utility software has been allotted 5% of the 1983 DP budget. Eleven DP managers said this figure is up from last year; four said it is down; 16 reported no change.

Communications Costs

An average 5.6% of next year's DP budget will go for communications. In 42% of the installations surveyed, this includes expected expenditures for both voice and data communications. Eleven of the 50 DP managers' budgets cover only data communications.

Only one person said he will spend less on communications in 1983. About half will spend the same as this year and half will spend more (two managers are increasing their communications budgets by 100% each).

'. . . Unlike last year, when salaries were the issue of greatest concern for DP managers, this year's managers cited the increasing demands on the DP department and the integration of new technologies such as decision support, telecommunications, office automation and microcomputers.'

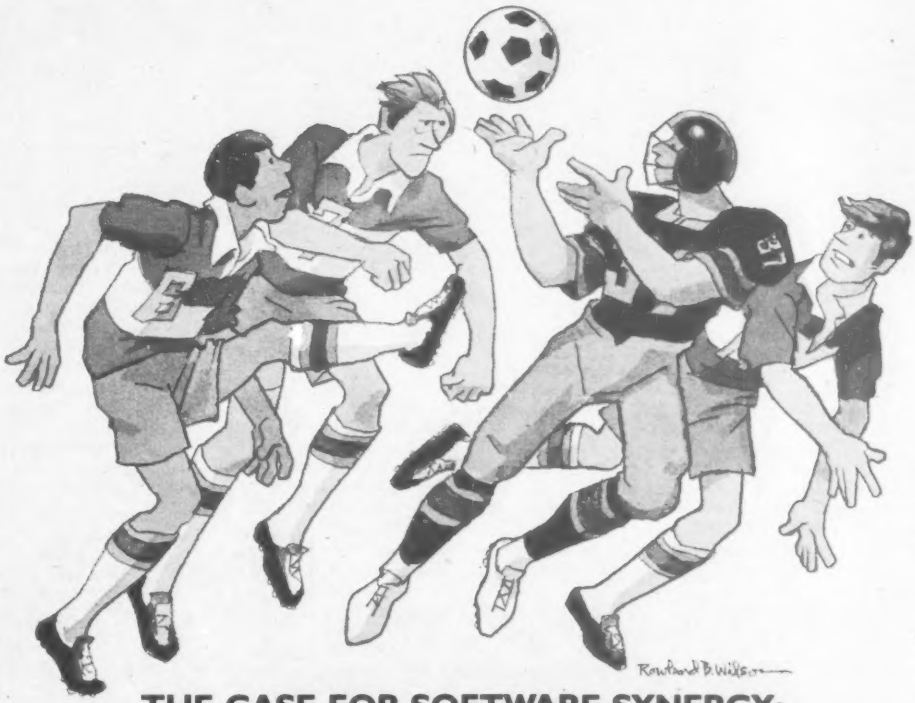
While only 12 of 50 managers have funds in their budgets (an average 6%) for local-area networks, none of the managers surveyed last year budgeted for local-area nets. Half of this year's surveyed managers said they will be spending the same amount in 1983 as they did in 1982 for local-area networks; two will spend "slightly more." Four other managers could not separate local-area network expenditures from communications costs in general.

The purchase and license fees for minicomputers will eat up an average 6% of the managers' budgets, and the maintenance of these systems will cost an additional 2%. However, 60% of the DP managers will spend nothing on minicomputers.

Mainframes will cost managers a whopping 15% of their budgets; only one manager indicated he will spend less than before. But the range was wide: Some managers will spend as much as 62% of their budgets in this category, other managers as little as 1%.

Service and maintenance costs for

(Continued on Page 6)



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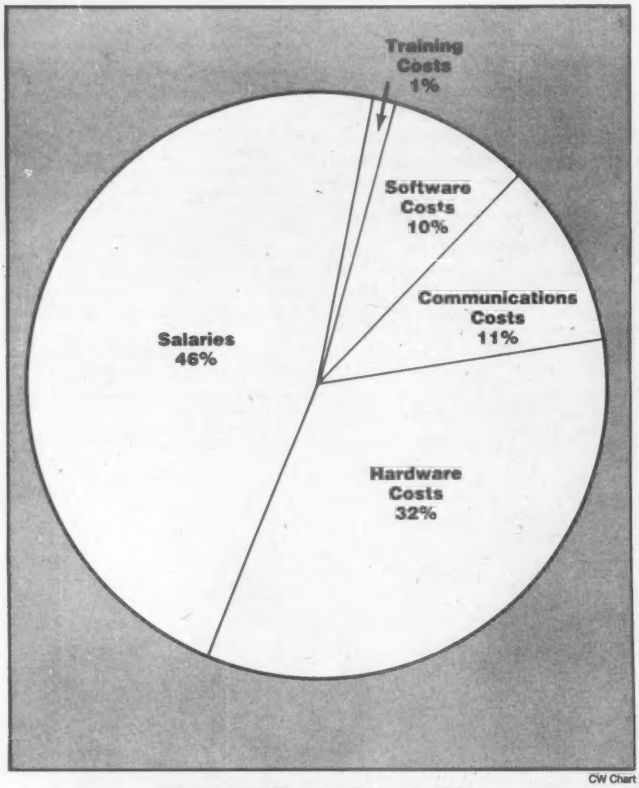

CW Chart

Estimated User Budgets in 1983

(Continued from Page 5)

those mainframes comprise another 2% of the DP budget. Managers will spend approximately 4% of their funds on peripherals.

All told, hardware costs will average 32% of the 1983 DP budget.

Of the 50 executives surveyed, 13 are responsible for selecting and buying personal computers in their organizations. Nineteen said the micros come out of end-user department budgets, six managers said the costs are charged to both the DP department and the end users' departments. The remaining 12 managers have no personal computers in their companies.

Of those that do buy personal computers, only three managers will spend 1% or more.

Whose idea was it to introduce personal computers into these organizations? In 45% of the cases, the DP department was responsible; 34% of the time it was end users; and the remaining 21% of the time, it was a combination.

Seventy-eight percent of those surveyed are also responsible for purchasing office automation equipment. The other 22% said these expenditures are made by the individual user departments.

New equipment will be purchased by 35 (70%) of the DPers polled. The planned acquisitions mentioned most often include word processing/office automation equipment (14 responses), mainframes (12), peripherals (11), minicomputers (8), personal computers (4) and software (2). Mentioned once each: graphics systems and communications products.

Issues of Concern

When asked what single item in their budget has gone up the most since last year, the DP managers agreed that salaries top the inflation list, with software a close second. Also mentioned seven times each were peripherals and maintenance.

Communications came up three times, and one manager said the rising cost of energy is his pet peeve.

But unlike last year, when salaries were the issue of greatest concern for DP managers, this year's managers cited the increasing demands on the DP department and the integration of new technologies such as decision support, telecommunications, office automation and microcomputers.

The primary concern of Dick Hudson, corporate director of MIS at Global Marine, Inc. in Houston, is "the introduction of computers as an effective tool to the user community. We're hoping to have awesome amounts of processing in the end users' hands by the end of '83."

For Howard Jones, director of information services at Westmoreland Coal Co. in Philadelphia, the primary concern is "building a distributed processing network and interfacing office automation with data processing."

Other major concerns included salaries, the economy, turnover, productivity, motivation and escalating costs of equipment.

However, the DP chief for a major valve manufacturing company said, "We don't have any concerns. We only have opportunities." ■

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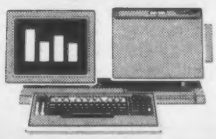

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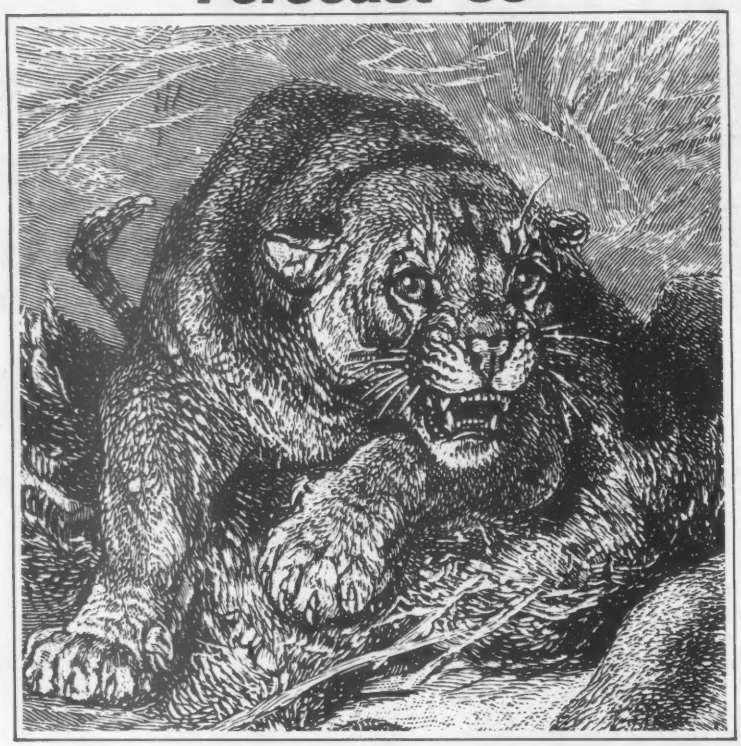

IBM One Year After the Reorganization

Lean, Mean And Hungry

By Paul Gillin

In 1982 the lion roared, and the jungle is not likely to be the same again.

With the chains of antitrust broken and its physique trimmed by a well-timed reorganization, IBM arose in 1982 to remind the computing world of just how much power a $29 billion company can wield in a crowded marketplace.

It has been 15 months since the Armonk, N.Y.-based computer giant revamped its marketing and service structure in a shakeup one analyst termed "massive, just outrageous," and nearly a year since the Justice Department dismissed its 13-year-old antitrust suit against IBM as being "without merit." In that time, most analysts, competitors and customers agree, IBM has become a formidable company indeed.

Its awkward three-pronged marketing force has been consolidated into a single structure. Large new accounts have been pursued with aggressive marketing campaigns featuring expanded product lines and aggressive pricing. At the same time, IBM has implemented a broad-based retail marketing plan for the Personal Computer which has been remarkably successful.

All of this has combined to ensure IBM's continued dominance in the mainframe market in which it already holds a 70% share, to demonstrate the company's leverage in the more competitive minicomputer arena and to establish an industry standard in personal computing — all in the space of only 18 months.

Key to this strategy was the October 1981 reorganization which folded all of the U.S. marketing and sales organizations into a single Information Systems Group split between large and small accounts. The move enabled IBM to regulate its product strategy closely while cutting down on the internal problems of the old arrangement, which often had salesmen scrambling over each other for the same accounts.

"IBM has evolved into a more aggressive, hard-hitting, leaner, meaner competitor," said Ulric Weil, analyst at Morgan Stanley & Co. "They're offering volume discounts, special bids, tough pricing and announcing new machines that are priced lower than their competitors'."

Jack Hart, an analyst at International Data Corp. (IDC), reiterated Weil's view. "The divisions had become very autonomous," he explained. "In many cases, you had General Systems salesmen trying to figure out solutions to data processing problems. It was almost embarrassing for IBM. They would argue over what division would take the business, and Wang [Laboratories, Inc.] would finally come in and take it."

"A lot of us found it very frustrating,

Paul Gillin is a Computerworld *staff writer.*

especially when the product lines were competing head to head," said Thomas Kelly, assistant vice-president in the business economics department at Metropolitan Life Insurance Co. and president of Common, an IBM small systems users group. "One salesman would say the System/38 is our obvious solution while another would say a 4300 is the obvious solution. Not everyone in our group made the right decision."

IBM indicated that the ultimate beneficiary of the reorganization would be the customer, a promise the company seems to have borne out. [See accompanying story,]

The shakeup also sent a clear message to the competitive community that IBM saw little substance in the U.S. Justice Department's antitrust suit. Three months later, the Justice Department concurred. "That gave IBM clean sailing to become aggressive in entering new markets," Weil said.

A Flurry of Products

A flurry of product activity has characterized the 15 months since the reorganization. IBM has twice extended its high-end processor line, with the 3081 Model Group K announced in October 1981 and the 3084 unveiled last September. The company also introduced its MVS/XA and VM/XA operating systems with extended 31-bit addressing capability, and indicated these will be the flagship operating systems for the 1980s. Additional versions of the 3033 Model Group S processor have been introduced and the 4300 series extended with the addition of six new models and an updated operating system.

To the delight of customers and woe of the competition, IBM has also unleashed a campaign to recapture market share lost steadily during the 1970s. This year the market began to feel the impact of a strategy begun in 1978 when, "IBM made some decisions that were significant to the industry," according to Bill Easterbrook, a Kidder, Peabody & Co. analyst.

Those decisions included price reductions, capital expansion (IBM increased its production space fourfold between 1978 and 1980, according to one analyst), creation of the IBM Credit Corp., moves into microcomputers and the decrease of rental income as a proportion of revenue.

The strategy has been successful on nearly all fronts. New pricing policies which emerged this year have left competitors gasping and analysts shaking their heads in admiration.

"It used to be that you could predict IBM's bid on a contract within one or two percent," said IDC's Hart. "You can't do that any more. We've been seeing discounts of 30%, 35%, even 40% in the high-end market."

"Some of their product pricing has been company-killing," said P. David Pappert, president of Vion Corp., a seller of IBM-compatible equipment to the Federal government. Vion filed and subsequently withdrew a suit against the Federal Bureau of Investigation this summer over the FBI's awarding of a $17 million competing contract to IBM. Although Vion undercut the computer giant's bid by $1 million, Pappert said, he was stunned by the competitiveness of IBM's offer. "We were prepared for a lot more money between IBM and us than a paltry $1 million," he said."

Some see IBM's now-frequent price cuts and product enhancements as a deliberate strategy to undercut competition from supermini vendors such as Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and Prime Computer, Inc. For example, said Frank Gens, analyst at the Yankee Group, IBM can draw on its vast advantage in installed mainframes and their entrenched Systems Network Architecture (SNA) to offer new products which are fully SNA-compatible. "In order to provide users with communications functionality, the competing vendor has to be able to hook into SNA," Gens said. The lag time of 18 to 24 months required to develop that capability gives IBM time to cut prices or release a new version of SNA, he added.

Profits sacrificed through price cuts will be recovered both through the heavier volumes and by regular price increases on unbundled software. Weil predicts "Operating margins on hardware programs are likely to decline to the vicinity of 20% from the typical 30% achieved for hardware and software combined. However, substantial earnings from unbundled, separately priced systems software and other support services should compensate for the lower profitability." The company has

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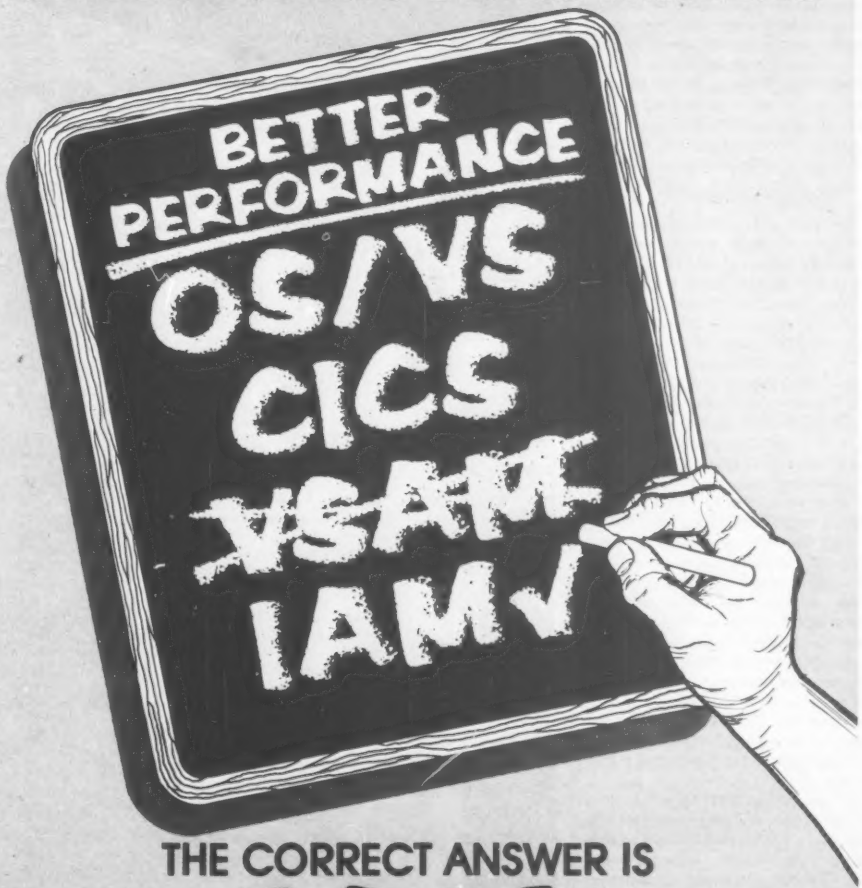
Don't Make The Same Mistake



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(Continued from Page 9)

also moved strongly this year to promote harmony with independent applications software vendors, a move which, Gens said, "will make it easy to use IBM systems in as many environments as possible."

This year, IBM has provided strong inducement for customers to buy rather than lease those systems, an indication that future announcements will come with increasing rapidity. "In round numbers, they've decreased purchase prices 30% and increased lease prices 30%," said Harry Edelson, analyst at First Boston Corp. "This is a sign that obsolescence is going to come more quickly. They can't have machines out there as long as they used to."

Virtually all leasing is destined to be handled by the IBM Credit Corp., created in March 1981, which buys equipment from the parent company and offers third-party financing. The arrangement allows IBM to increase cash flow and turn over new products without worrying about liability for old machines in the field. The change also looks good on the bottom line. In the nine months ending Sept. 30, IBM reported a 5% increase in rental revenue against a nearly 24% jump in sales income.

Wooing Customer Loyalty

The past year has also seen IBM take new steps to ensure customer loyalty by offering smoother migration paths at the high end of the product lines. Significant expansion has occurred in the field-upgradable 4341 and 3080 series, allowing a 4341 user to expand from .4- to 1.2 million instructions per second (Mips) or a 3080 user to move from a 3 Mips 3083 to a 27 Mips 3084 by simply upgrading CPUs. "In the past, the closest they've come to field upgradability was hooking two machines together," Hart said. IBM has also recently offered its 3087 Model 2 air-cooling unit on the 3080, making migration more attractive to users of the air-cooled 370s and 4300s.

But perhaps the most dramatic IBM success story of the year has been the Personal Computer. Announced in August 1981, the Personal Computer has almost singlehandedly legitimized the microcomputer market and set the scene for new IBM forays into office automation and distributed data processing.

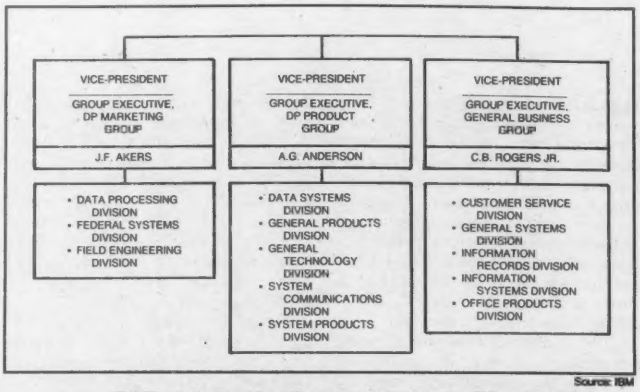
IDC expects IBM to ship over 180,000 Personal Computers in 1982, accounting for over $1 billion in revenues. First Boston expects more than 300,000 Personal Computers will be sold in 1983. Analyst Hart believes that fully one-half of all micro software activity is now oriented toward the Personal Computer. "The enormous success of the Personal Computer this year has blown everybody's mind," he said.

Other observers, though less impressed, say the Personal Computer represents an important new strategic direction for IBM. "From announcement day on, we weren't surprised at the Personal Computer's success," said Gideon Gartner, president of the Gartner Group, a Stamford, Conn.-based firm. "They showed an attitude toward distribution and the open architecture concept which marked it as an immense success."

With casual aplomb, IBM entered the Personal Computer into the uncharted retail market and settled in comfortably. "For a company of that size and complexity to establish channels of distribution with Sears Roebuck & Co. and Computerland and have it succeed that quickly is surprising," Hart said.

Other advances into end-user marketing include an expanding chain of IBM-operated retail stores and a commitment to establish permanent exhibits in computer market centers around the country. IBM's ability to sell directly to the end user

(Continued on Page 11)



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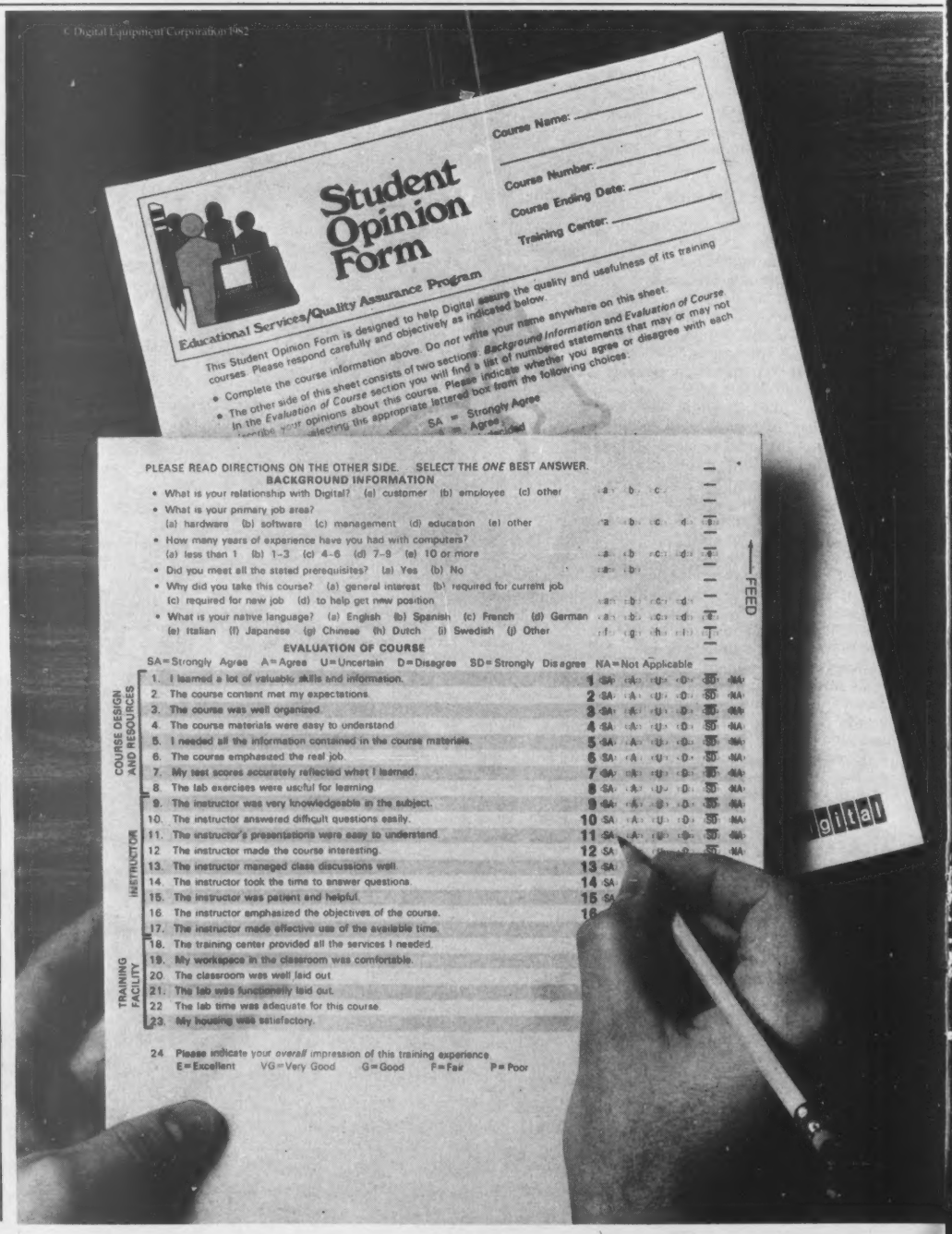
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SA = Strongly Agree
A = Agree
PLEASE READ DIRECTIONS ON THE OTHER SIDE. SELECT THE ONE BEST ANSWER.
BACKGROUND INFORMATION
• What is your relationship with Digital? (a) customer (b) employee (c) other
• What is your primary job area?
(a) hardware (b) software (c) management (d) education (e) other
• How many years of experience have you had with computers?
(a) less than 1 (b) 1-3 (c) 4-6 (d) 7-9 (e) 10 or more
• Did you meet all the stated prerequisites? (a) Yes (b) No
• Why did you take this course? (a) general interest (b) required for current job (c) required for new job (d) to help get new position
• What is your native language? (a) English (b) Spanish (c) French (d) German (e) Italian (f) Japanese (g) Chinese (h) Dutch (i) Swedish (j) Other
FEED
EVALUATION OF COURSE
SA=Strongly Agree A=Agree U=Uncertain D=Disagree SD=Strongly Disagree NA=Not Applicable
COURSE DESIGN AND RESOURCES
1. I learned a lot of valuable skills and information.
2. The course content met my expectations.
3. The course was well organized.
4. The course materials were easy to understand.
5. I needed all the information contained in the course materials.
6. The course emphasized the real job.
7. My test scores accurately reflected what I learned.
8. The lab exercises were useful for learning.
INSTRUCTOR
9. The instructor was very knowledgeable in the subject.
10. The instructor answered difficult questions easily.
11. The instructor's presentations were easy to understand.
12. The instructor made the course interesting.
13. The instructor managed class discussions well.
14. The instructor took the time to answer questions.
15. The instructor was patient and helpful.
16. The instructor emphasized the objectives of the course.
17. The instructor made effective use of the available time.
TRAINING FACILITY
18. The training center provided all the services I needed.
19. My workspace in the classroom was comfortable.
20. The classroom was well laid out.
21. The lab was functionally laid out.
22. The lab time was adequate for this course.
23. My housing was satisfactory.
24. Please indicate your overall impression of this training experience.
E=Excellent VG=Very Good G=Good F=Fair P=Poor
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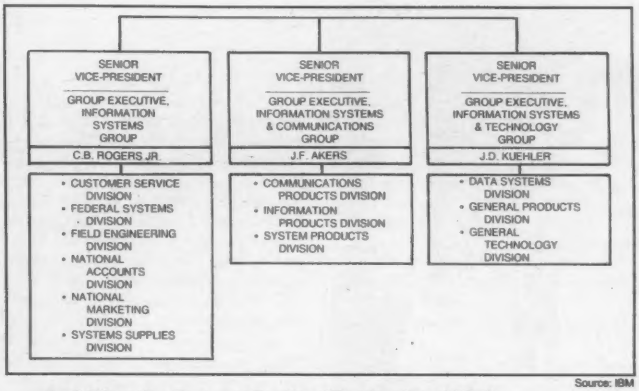

Source: IBM

. . . And After the Reorganization (September 1982)

(Continued from Page 10)

will become vital as mainframe revenues shrink from 81% of the total dollar market for computers in 1976 to 40% in 1986, according to IDC.

The leaner, meaner IBM promises to be a stronger market force in 1983 than at any time in the last decade. The company is boasting rising profits at a time when the country, and the industry, is bogged down in a recession. "People are taking it for granted that IBM is again a profitable company," said First Boston's Edelson."

The coming year is likely to see IBM continuing policies which have been successful in the past year: price competition, improved migration possibilities, increasing orientation toward the end user and ventures into new markets like communications, services, robotics and office automation. Now that the antitrust burden is gone, IBM is likely to continue to enter into cooperative arrangements like those announced this year with Mitel Corp. and Intel Corp. Diversification and price competition will also help insulate the company against the growing threat from the Japanese.

For second- and third-tier competition, the battle is only beginning. "Some competitors may not be able to stand the heat for long," said Weil. "But in a competitive environment, the customer is the winner." ■

Users See Improvement

Users have profited from IBM's new, more aggressive marketing strategy and consolidated sales force, according to an informal *Computerworld* survey of DP managers. Of 10 IBM shop managers interviewed around the country, eight said they had seen a marked improvement in IBM's responsiveness to their needs since the computer giant's reorganization in October 1981. The two dissenting voices were from users of small IBM systems.

"The service has gone from good to better," said Jim Sproules, director of computer operations at Georgetown University in Washington, D.C. "They seem to have gone out of their way to keep up to date and follow up on problems."

Sproules said he hears from an IBM sales representative weekly. The frequency of contact "has increased dramatically from a year ago."

Georgetown University uses IBM 370/148, 4341 and Series 1 systems.

Better Trained Staff

A large New England user, who asked to remain anonymous, said his planning staff was impressed by IBM's response to their recent upgrade needs. "A few years ago, the small and big systems people would have two recommendations for one problem," he said. "That has stopped and our people are very pleased with that."

A similar observation was voiced by a 370/158 and 3081 Model Group D user in Universal City, Calif. "A year ago I was trying to get all the IBM salesmen just to talk to each other," said Al Jerumanis, director of corporate DP for MCA, Inc. "Now they seem to have made a genuine effort to cross-train their sales people and to understand my needs."

But Jerumanis criticized IBM for not notifying him of an impending price reduction last year. "I was surprised and infuriated by a price reduction on our 3081 four months after we bought it," he said. "They had the right idea, but the timing was perceived as a negative action by our directors."

However, another 4331 user in New York complained that service and sales has deteriorated in his shop. "If you're a medium-size account like us you get very little service," he said. ■

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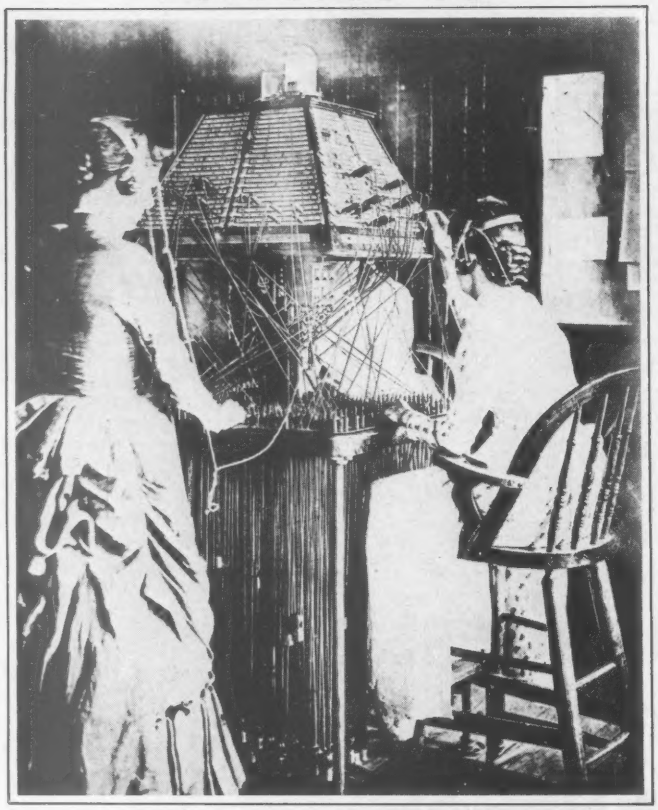

The AT&T Settlement

Making the User Connection

By Phil Hirsch

Although the government's antitrust suit against AT&T probably has been settled, the agreement has generated more questions than answers.

But amid the many uncertainties, there is at least one near-certainty: The acquisition and use of telecommunications facilities will become more complex for users.

As Bob Bennis, manager of communications systems at Westinghouse Corp., explained last November [CW, Nov. 1], "The major factors [responsible for increasing telecommunications costs] are inflation and regulatory decisions over the past several years. The divestiture agreement, however, is part of a trend which began with those earlier decisions — a trend toward replacement of regulation by modified competition. There's no question in my mind that the user is paying a price for this migration and that he'll continue to pay it for some time.

"It isn't an across-the-board payment, though. There are some areas where competition is already controlling, and even lowering, prices," Bennis pointed out. But, he cautioned, "It's going to take time for the benefits of the modified competition policy to become widespread. How long it takes and how widespread its effects will be depend on whether the principals follow the spirit as well as the letter of the divestiture agreement."

During the next several months, the spirit and letter of the settlement will be continually in the public spotlight as the Federal Communications Commission (FCC), Congress and the courts wrestle with the issues raised by what has been called the biggest, most complicated antitrust settlement of all time. One matter of particular interest to users is how the costs of telecommunications service will be reallocated now that the "separations/settlements" process is about to be junked.

Another key question is whether the settlement's main provision — the requirement that AT&T divest 22 of its operating companies — will make the telecommunications industry truly more competitive.

If the government's settlement with AT&T causes communications charges to rise, it will be rather ironic. The Department of Justice spent eight years (1974-82) and several million dollars prosecuting the phone company on the assumption that it would result in lower

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Phil Hirsch is senior editor/communications for Computerworld.

communications rates.

The government argued that Bell, by preventing specialized carriers from interconnecting their facilities with the telephone network and by requiring special interfaces for terminals made by other vendors ("foreign attachments"), was illegally limiting competition, particularly from new, more cost-effective suppliers of services and hardware. The payoff for AT&T, according to this argument, was perpetuation of a market in which the company could not only charge excessive prices, but could compound this sin by unnaturally prolonging the service lives of its products.

The terms of the settlement announced by AT&T's Chairman Charles Brown and Assistant Attorney General William Baxter last January were a good deal less painful for Bell than the terms originally demanded by the government. The January agreement required divestiture of only 22 Bell operating companies. A demand that Western Electric also be divested was dropped.

After the initial version of the settlement was unveiled, it went through an extended period of public comment and review. More than 600 individuals and organizations submitted 8,000 pages of comments.

After analyzing this material, Judge Harold H. Greene, who presided over the U.S. vs. AT&T case, demanded a number of changes on Aug 11. A short time later, the two parties agreed to the changes. The resulting document, generally referred to as the Modified Final Judgment, provides the blueprint for the reorganization of the Bell System which AT&T is now implementing.

However, 14 states, Tandy Corp. and the North American Telecomunications Association (a trade group representing independent manufacturers of private branch exchanges, telephones and similar terminals) have asked the U.S. Supreme Court to review the judgment. And Mark Fowler, chairman of the FCC, has asserted the commission's right to "review AT&T's divestiture proposals to protect the public interest," as he put it in testimony Dec. 1 to the House of Representatives' telecommunications subcommittee.

Judge Greene has "acknowledged" the commission's right to review the final divestiture arrangements, added Fowler, but the commissioner neglected to say who would have the last word in case the commission and the court disagree.

These are the major provisions of the Modified Final Judgment accepted by Judge Greene:

- AT&T must give up its 22 wholly owned operating companies. However, it holds on to the Long Lines Division, which will continue to provide regulated interstate communication services, and Western Electric and Bell Laboratories.
- The consent decree signed by AT&T and the Justice Department in 1956, at the end of an earlier antitrust suit, has been "modified." Its restrictions barring the phone company from offering unregulated services are removed.

However, the Modified Final Judgment adds one restriction: AT&T cannot offer any electronic information service for at least seven years after divestiture.

- The Bell operating companies must sell their embedded base of terminal equipment, plus their inventories, to AT&T, but they can market new equipment after divestiture. They can continue offering Yellow Page directory service and continue collecting the lucrative advertising revenue that goes with this activity. In addition, they can offer unregulated services by proving to Greene or his successor that such activity will not diminish competition.
- Between the divestiture date (probably Jan. 1, 1984) and 1986, the Bell operating companies must gradually provide exchange access to all intercity carriers equal to that provided by AT&T.
- Implementation of the agreement must be approved by the U.S. District Court.

Since last January, when the initial version of the agreement was unveiled, there has been much argument over whether U.S. Assistant Attorney General William Baxter should have held out for more. It was

(Continued on Page 14)

Key Events in the U.S. vs. AT&T Lawsuit

Nov. 20, 1974: The U.S. Justice Department, representing the federal government, files suit against AT&T. The case is assigned to Judge Joseph Waddy of the U.S. District Court in Washington, D.C.

Feb. 4, 1975: AT&T denies all charges.

Oct. 1, 1976: Waddy rules that the suit is proper and that he has jurisdiction. AT&T appeals.

Sept. 8, 1977: The Supreme Court agrees with Waddy that he has jurisdiction over U.S. vs. AT&T.

June 21, 1978: The case is assigned to Judge Harold H. Greene after Waddy becomes ill.

Jan. 5, 1981: After 2½ years of developing evidence, lawyers for AT&T and the Justice Department agree on the "concept" of a settlement.

Jan. 15, 1981: The trial begins, but Greene immediately recesses it until March 2 so the parties can prepare a formal consent decree describing the details of the settlement.

Jan. 20, 1981: President Ronald Reagan is inaugurated. Major personnel changes occur within the Justice Department, which then announces that it cannot meet the March 2 deadline.

March 4, 1981: The trial recess ends.

March 9, 1981: William F. Baxter, newly appointed chief of the Justice Department's Antitrust Division, vows to litigate the AT&T case "to the eyeballs."

July 1, 1981: The Justice Department completes the presentation of its case. AT&T requests dismissal of the charges.

July 29, 1981: Baxter asks Greene to delay the trial 11 months so Congress can address the issues. The judge refuses.

Sept. 11, 1981: Greene refuses to dismiss the charges. The Justice Department has demonstrated "that the Bell system has violated the antitrust laws in a number of ways over a lengthy period," he says.

Dec. 31, 1981: Baxter and AT&T announce they have resumed negotiations to reach a settlement of the case.

Jan. 8, 1982: Baxter and AT&T Board Chairman Charles Brown announce agreement on the terms of a settlement.

Jan. 11, 1982: U.S. District Court Judge Vincent Biunno, responsible for overseeing the implementation of the consent decree that AT&T and the Justice Department signed in 1956, approves the new settlement as a modification of the 1956 decree.

Jan. 15, 1982: Biunno transfers jurisdiction over the consent decree modification to Greene in Washington.

Jan. 21, 1982: Greene defers his decision on the Modified Final Judgment and establishes procedures for public comment.

Jan. 26, 1982: Rep. Tim Wirth (D-Colo.), chairman of the House of Representatives Telecommunications Subcommittee, says he is studying legislative action aimed at modifying the proposed settlement.

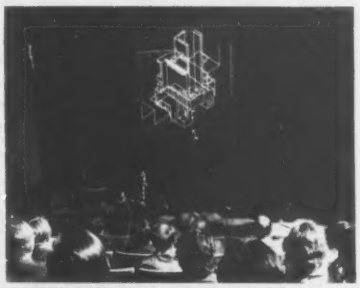
Feb. 19, 1982: The 60-day period for public comment on the settlement begins.

May 5, 1982: Greene gives the Justice Department until May 20 to respond to public comments.

May 25, 1982: Greene orders a second public comment and response period, with a June 14 deadline.

Aug. 11, 1982: Greene issues an opinion on the proposed Modified Final Judgment, calling for a number of changes.

Aug. 19, 1982: AT&T and the Justice Department accept Greene's changes. ■



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(Continued from Page 13)

obvious, according to the government's critics, that AT&T was desperate to get into the on-line information services business, and it was equally obvious that it could not do that as long as the 1956 consent decree remained in effect.

The critics also contend that the government was about to win its antitrust suit against AT&T.

Another criticism of the settlement is that, by accepting a lesser degree of divestiture, the government has enlarged the FCC's role. Possibly the best argument for not doing that was given by the Justice Department itself when, in a pretrial brief submitted to Greene in December 1980, it said that "the FCC's inability to control AT&T's pricing [is due to the] inability to develop an adequate method of preventing [the company] from cross-subsidizing services that are subject to competition. There is no consensus on how to correctly allocate costs between 'competitive' and 'monopoly' services ... While the FCC has an incentive to clarify these complexities, AT&T ... has an incentive to hide its cross-subsidies by submitting inadequate and vague cost information."

The "futility" of FCC attempts to verify the phone company's cost figures, the statement added, is illustrated by the FCC's admission, 16 years after it began to investigate those rates, that their lawfulness "simply cannot be established."

The statement pointed out that the commission has been trying since 1971 to make AT&T provide "fair and equitable access to its essential facilities," yet today there is still a major argument over this question. One reason is that Bell and its competitors historically have been allowed to work out interconnection terms and conditions. The commission played the role of referee and final judge.

The FCC is now taking a more active role. However, it is unclear, given the agency's limited resources, whether this approach will be any more effective.

Half a Loaf?

After the U.S. vs. AT&T settlement was announced, Assistant Attorney General William Baxter has been criticized for accepting half a loaf or less in response to pressure from the White House. Another explanation for this is that between 1974 and 1982, on-line computer-based systems and services became a critical national resource — capable of increasing domestic productivity and erasing foreign trade deficits. Lopping Bell Labs and Western Electric off the AT&T organization chart would have been foolish, according to this reasoning, because it would have reduced drastically the nation's ability to exploit computer communications technology.

The Department of Defense also reportedly played a key role by insisting that the nation's defense is critically dependent on the long-distance telephone network. This might help explain why the government did not push its initial demand for separation of AT&T's Long Lines Division from Bell Labs and Western Electric.

Another possible reason is Baxter's reported view that the settlement — by breaking Bell's control over local-exchange facilities and requiring the Bell operating companies to interconnect on equal terms with all interexchange carriers — effectively eliminates the basis for AT&T's long-distance monopoly. The company's present dominant market share, he added, should wither away within a relatively few years.

Whether Baxter is right is possibly the biggest single question raised by the AT&T settlement. To some observers, the fact that Bell and the independent telephone companies currently carry the vast bulk of intercity communications traffic indicates that AT&T's monopoly will persist for some time. As Rep. Tim Wirth (D-Colo.), chairman of the House of Representatives Telecommunications Committee, argued Nov. 9 in a speech to state utilities regulators, "AT&T, with its noncompeting partners, still controls over 90% of the long-distance market and it will be many years — because of the cost of plant and other factors — before true competition will exist."

Battles Over Rates

One of the "other factors" is the access charge to be levied on interexchange carriers for the use of local-exchange distribution facilities. The Byzantine complexity of this issue is

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indicated by the fact that three separate access charge proceedings are under way.

One proceeding is concerned with "separations" — in other words, what costs of the nationwide telecommunications network should be allocated to interstate customers and what costs should be allocated to local-exchange users. The other two proceedings are concerned with "access charges" — how much interchange carriers and other long-distance users should reimburse the operating companies for the costs with which the latter are saddled as a result of the separations process.

At present, Long Lines Division pays a "settlements" fee to the Bell operating companies for the use of their facilities. This negotiation, like separations, is conducted within the industry, not at the FCC. (In fact, the two negotiations occur concurrently and are usually referred to as the "separations/settlements process.")

The other common carriers pay the local operating companies a tariffed Exchange Network Facilities for Inter-Exchange Access (Enfia) fee set by negotiation among the parties concerned and subject to final approval by the FCC. One of the pending proceedings is concerned with these charges; the other is aimed at setting a uniform access charge for all intercity users — Long Lines, other common carriers and private network users — that will impose a fair share of the burden on each.

At the moment, the Enfia controversy is generating the most heat. A few months ago, the FCC allowed AT&T, which negotiated the Enfia agreement on behalf of its operating companies, to raise charges $5/mo per connection beyond an interim rate set last spring. The phone company, along with a number of specialized carriers, has taken this ruling to court. AT&T insists the new rate is too low, while the specialized carriers argue that it is too high.

Since Enfia charges represent an estimated 25% of what it costs the other common carriers to service their customers, the outcome of this battle will have a signficant impact on the competitiveness of the intercity communications market. This is particularly true since it will be some time, if ever, before the FCC comes up with a single access charging scheme acceptable to both AT&T's Long Lines Division and the other common carriers.

Another knotty issue buried in the access charge proceeding (formally known as FCC Common Carrier Docket 78-72) is whether private net operators should pay more or less for use of local-exchange facilities.

Service Territories Under Fire

In addition to rates, Bell and its competitors are arguing about the Local Access and Transport Areas (Latas) that will replace the Bell operating companies' present service territories when divestiture occurs.

Today, the outer limits of each Bell operating company's territory generally follow state boundaries — within each territory are local exchanges serving population centers. The new scheme abolishes local-exchange areas, creating an opportunity, according to the critics, to subsidize what is now intrastate long-distance service with revenues derived from what is now local-exchange service.

Leading this chorus of critics, understandably, are the other common carriers. Much of their income is derived from servicing cities that will be within the same Latas.

One way for the other common carriers to evade the effects of high Enfia charges and overly large Latas is to bypass the Bell operating companies' local-exchange networks. Digital Termination Systems (DTS) represent the most popular option at the moment.

A DTS is a microwave-based local network connected to other DTS through terrestrial or satellite intercity transmission facilities. The local and intercity facilties, when combined, are known as Digital Electronic Message Services (Dems). They provide all-digital transmission, end-to-end, at speeds up to 1.5M bit/sec.

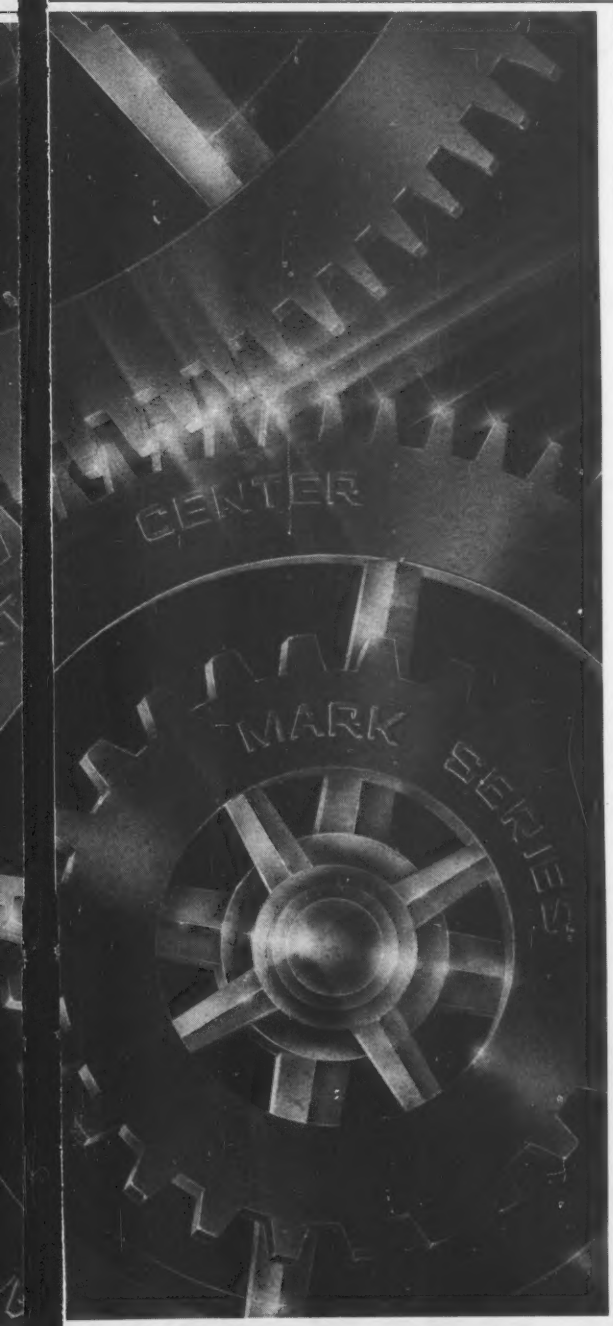
Nearly 40 suppliers have asked the FCC for permission to offer Dems, and nine applications have been approved. Even if no more systems are authorized, it appears likely that over the next five years or so DTS networks will be installed in most of the nation's larger cities.

The Unregulated Marketplace

Besides impacting the regulated communications market, the Modified Final Judgment erases the 1956 consent decree barring AT&T from offering unregulated services. The phone company is clearly eager to get into this business and has unveiled its first major product, the Advanced Information Service/Net 1000.

Next fall, in collaboration with Knight-Ridder Newspapers, Inc., AT&T will begin offering videotex service on a regular commercial basis, the first in the nation.

Meanwhile, the phone company is busily converting its present, largely analog network into one that can carry voice, data, facsimile, graphics and video from the sender's doorstep to the recipient in a single, integrated bit stream — a scheme that will support numerous additional computer communication services. ■



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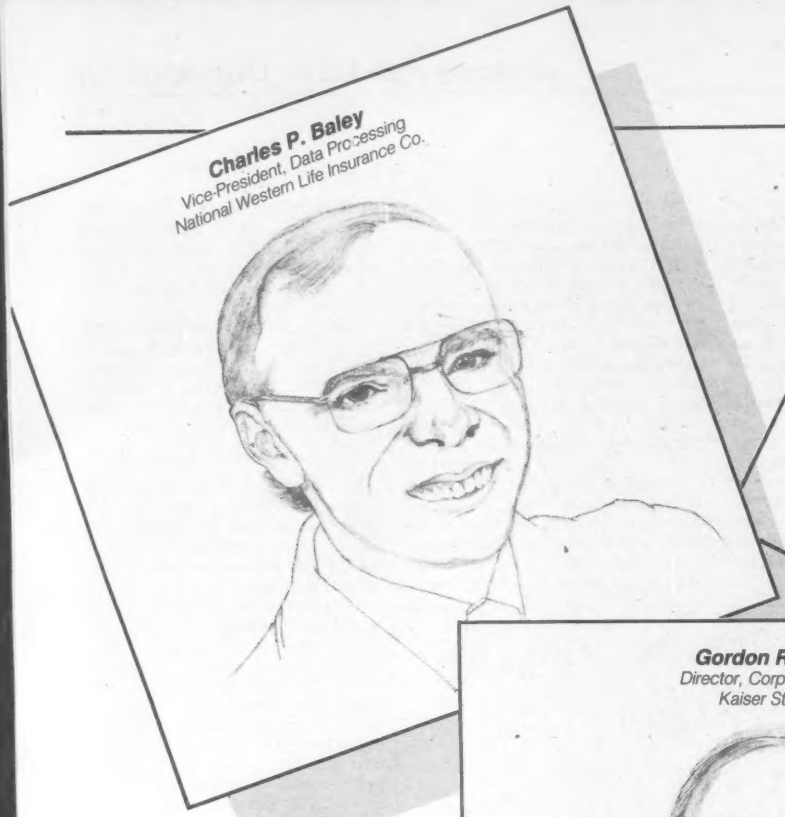

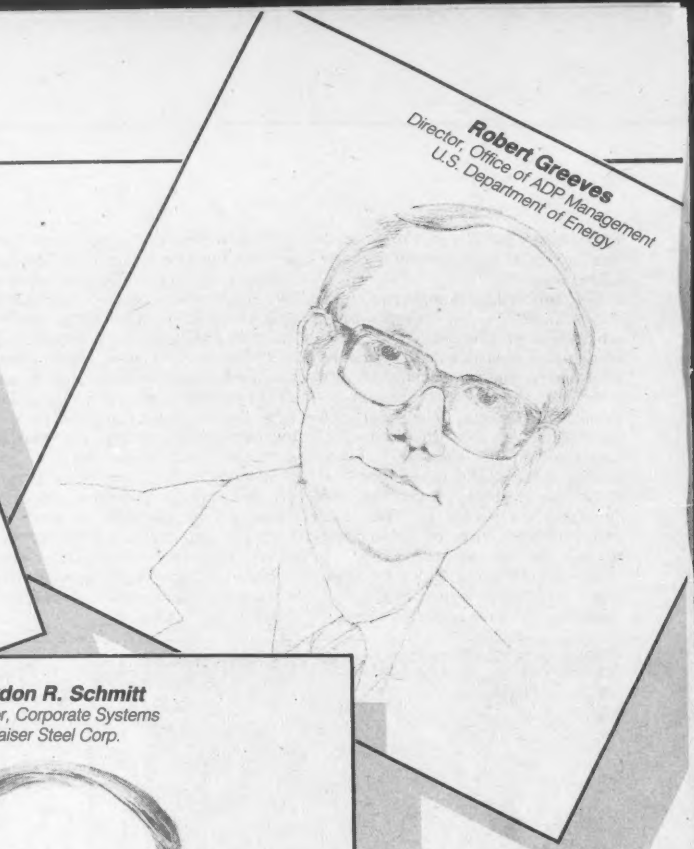

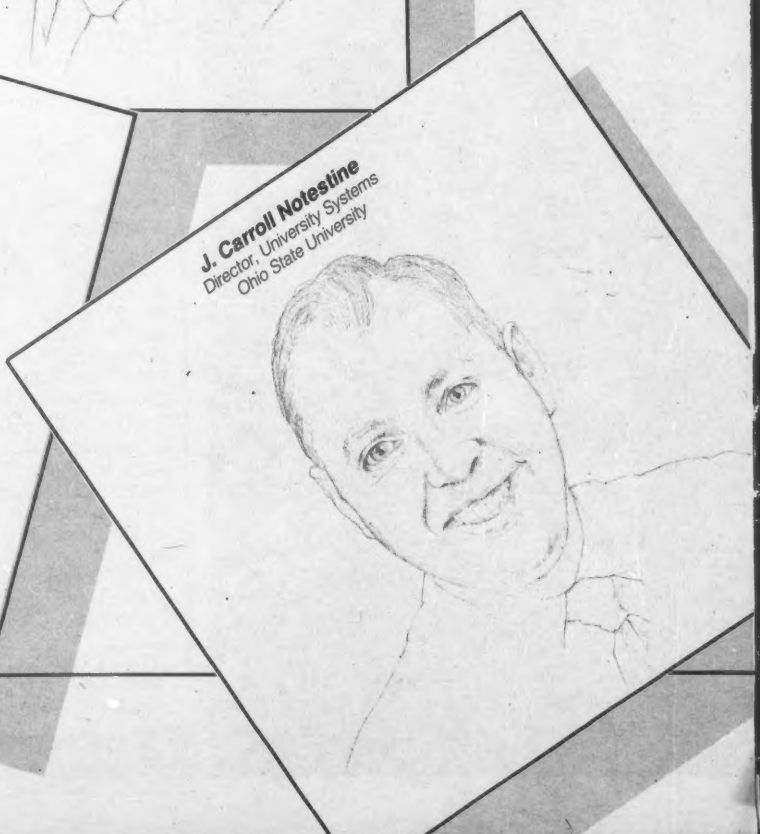

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MIS Execs Explore the Near Future

Predictions From the Home Front

By Bob Johnson

Computer gurus, media darlings, experts, analysts, scientists and manufacturers — these are the people most likely to be asked to predict the near future state of DP affairs. But the people best able to forecast the future of this business are probably those who, on a daily basis, see the trends emerging, make the policies and drive the product demand for this mammoth industry. These people are the DP and management information system (MIS) executives.

In an attempt to find out what the year ahead will bring, Computerworld *interviewed five top MIS executives in the industries that represent the largest groups of computer users among its readership — the financial, insurance and manufacturing arenas, government and education. The people interviewed represent DP shops both large and small in different areas of the country and are users of various vendors' products. The interviewees included the following:*

- *From the financial industry — traditionally a heavy user of computers and often a barometer for the economic stability of DP — John F. Maher, vice-president of DP for the Dollar Savings Bank in New York.*
- *From the insurance industry, Charles P. Baley, a vice-president of DP at the National Western Life Insurance Co. in Austin, Texas.*
- *From the manufacturing industry, Gordon R. Schmitt, director of corporate systems for Kaiser Steel Corp. in Fontana, Calif.*
- *From government, Robert Greeves, director of the Office of ADP Management for the U.S. Department of Energy, the largest federal computer user with 25% of all government computing equipment.*
- *From academia, J. Carroll Notestine, director of university systems at Ohio State University.*

In what ways will information processing in the near future influence the corporate hierarchy, particularly the company president and chief executive officer (CEO)? What will it mean to DP?

Greeves: A lot of people both in government and in industry are finally waking up to the fact that the control and management of information will dictate how an organization moves in the future. In all probability, this will be the dominant factor of control, and senior executives will have to be more interested in information resource management, which translates into more top-level exposure for the DP manager.

Baley: More DP exposure to corporate management will help bring the MIS [management information systems] executive into upper management itself. It's obvious that CEOs who are using information will either have to master the use of it themselves or hire a high-priced aide who knows how. The MIS executive is the CEO's likely choice for assistance.

Maher: As executives become more aware of what computers can do for them, they will increasingly seek more information in the form of timely reports and analysis data. The MIS guy, in turn, will become more than ever before involved in corporate decision making as a result of this.

Schmitt: I see a [vice-president] of systems on the horizon. For business to remain competitive 10 years from now, corporate officers will have to be more involved with this resource called data. When the corporate officers need to call upon the DP organizations to supply this resource, the [vice-presi-

(Continued on Page 18)

Bob Johnson is Computerworld's *New York correspondent.*

(Continued from Page 17)

dent] for information systems will become a reality.

Notestine: Because we are an academic organization, I can only say that we haven't seen any change in the administration's attitude in regard to DP in the last five years. However, the president of the university now sees the computer science curricula becoming more in demand now and in the future — he's now more aware of DP's importance overall.

What areas of hardware and/or software will, in your estimation, advance or change the most in the near future?

Greeves: The biggest change I see will come in the area of general-purpose computers. The larger ones will become more modular. This modularity will make it easier to buy systems which will probably offer technological enhancements and advancements within a medium-range time frame, such as support systems in microcode.

Unlike today, where most users replace IBM systems with more IBM systems, for example, the user of the future will go away from the basic vendor because of conversion costs. He will think more in terms of networking and subsystems and not worry so much about the vendor.

The faster local-area networking becomes available, with standards and broadband and baseband approaches, the faster users will become involved in modular computing.

Notestine: One buzzword that I hear is "fourth-generation languages." There will be a lot of products employing these languages which will emphasize simpler computer installation and software that is "usable" by customers. Most things will be designed to help the user.

Baley: On-line interactive hardware and software are the major things to look for. Also, the interaction between minicomputers and mainframes will present a minor boon to the industry. Right now it is difficult tying personal computers into mainframes without big costs and a lot of confusion.

Maher: I think the areas of hardware that will change will be in minis and microcomputers. With the costs continually coming down on this hardware, it's likely that it will be incorporated into the DP environment more.

Two other major occurrences will be in better available system storage capabilities, considering the voluminous amounts of data needed to be stored and the emergence of more software packages.

Schmitt: There will be a few major impacts. One area, especially in IBM shops, is the introduction of terminals with smaller footprints that are designed for the executive's desk. The standard IBM 3270 doesn't qualify. The terminal will have to evolve to a point where it becomes a small personal computer with local processing capabilities and perhaps a telephone connected.

A major direction in the near future for the user is [distributed data processing]. Users will demand — and get — processing close at hand.

Will the personal computer affect your DP operation in the near future? How?

Greeves: The [personal computer] will be a boon to the end user. Because the users will have these processing capabilities in their own areas, organizations will be forced into leaving more decision making to them. As a result, over the short haul, more pressure will be put on information management areas in trying to integrate the [personal computer] into the operation.

Schmitt: The [personal computer] will affect the industry, but from the standpoint of support, not in the development or installation of programs which will be for the most part packaged.

In the areas of education and communication, the [personal computer] will be most valuable in retrieving data.

Baley: I see the [personal computer] as a positive occurrence in this industry. A lot of system development work could be done at home by programmers using these computers. In the insurance business, they will affect the way field agency offices function. These offices will use the [personal computers] with our own software and software packages.

Notestine: The [personal computer] has certainly affected the area of education: It has radically changed the style of student instruction. Instead of the students having to use the university's main systems to do their research, they use [personal computers].

As far as faculty and staff are concerned, only 10% or 15% have been using [personal computers] in their normal procedure. How-

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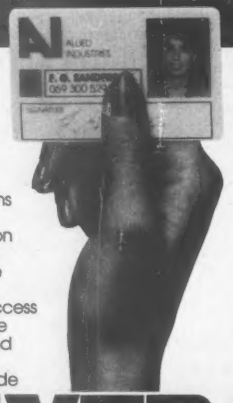

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ever, everybody has something that they want to do on a [personal computer]. It's probable that five years from now the [personal computer] will make word processors obsolete because of their ability to do [word processing] faster and at less expense.

Maher: The [personal computer] will make the public, in our case the customer, more educated about DP and how things operate. Things such as bill paying and stock analysis will be done using the [personal computers], stimulating customer interest. Our bank doesn't have any plans for [personal computers] yet, because the cost is prohibitive, but we are looking into the possibility of a home linkup, possibly with the TV.

What long-term effect will past and present economic hard times have on DP in general?

Baley: I don't think it has hurt it too badly. It has probably slowed down the salary increase range from about 10% to 12% down to about 8%, but that's about it as far as I can see. A positive effect is that it has tamed spiraling salaries common in the industry and has also stemmed job-hopping.

Maher: DP hasn't been affected as much as other businesses. In fact, with the price of hardware coming down, and the price of personnel going up, DP expenditures almost equal out.

Notestine: We have been affected very little. We never have money at the university to spend freely, so we never do experimental projects. Where we have felt a pinch is in how we use what we have. I'd say we've had a retrenchment on the average of about 5% in the last two or three years, so we do things like cutting the use of disk space a little closer.

Greeves: It hasn't had much effect on federal government DP. To a certain extent, the government is a little better insulated, so we haven't felt any major negative effects.
I think that in both government and private organizations, DP fares better than other industries.

Schmitt: The most obvious effect I have seen is the delay of projects due to budget decreases.

Do you see any problems acquiring high-caliber programmers and systems professionals, considering the highly touted shortages?

Maher: Yes, I do see a problem. The next two or three years are crucial. The problem exists because there is a lot of money spent on training, but worker productivity is not seen for a long time. A systems analyst from manufacturing cannot make an easy transition into banking — there is training and retraining involved.
You also find that once someone is trained, they move to more lucrative

(Continued on Page 20)

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jobs. What is needed is people trained in both DP and the industry they work in.

Schmitt: There is always this problem in DP. The industry has to do more training and get more business professionals with DP skills. Business professionals can be found anywhere, and if they are trained in DP it may satisfy some of the shortage problems. Conversely, DPers will have to be more oriented in understanding business, as opposed to hardware and software, so they can more easily move within the industry.

Notestine: I don't stay awake at night worrying about it, but I'm used to the problem because university salaries have never been top of the line and people are tough to get. Our best solution to staffing needs is the hiring of our computer science graduates. They are familiar with the systems and are experienced.

'The microcomputer will be the big deal of this decade. It will get people to use computers who never had exposure to them and will profoundly change expectations of how information can be processed.'

Greeves: Ours is the traditional problem of not being able to compete with private industry salaries. The hard fact is that you can make more money in the private world.

Baley: There are no problems in our case because we are in a favorable geographic location and close to the company which developed our operating software. However, I think the insurance industry will have problems because most of the software written for it is in assembler and there just [aren't] many good assembler programmers around.

What one trend will dramatically change the DP industry or DP within the corporate structure?

Schmitt: I see several trends. The largest single factor will be the integration of the [personal computer]. The [personal computer] is really a small portion of office automation — an area I see as exploding in the future. With word processing now being done by [personal computers], the field will grow like wildfire, and there will be even more justification to have them because of it.

Another thing is the recognition of data as a resource by the DP organization. The MIS area will realize that it will spend more time managing data. The user will have to have the tools to generate data and the DP area must supply them.

We will have to look at data as information which people need to know. If we see it as a resource, more kinds of tools will emerge, such as data dictionaries, in which to manage this resource.

Process automation — more automation and robotics in the work place — is also coming. In manufacturing we are finding that information which is a by-product of process automation is valuable for managerial analysis at a later time. This "bit bucket" data is being recognized as being worth more to people other than those just controlling the manufacturing process. The U.S. is behind in this area but it will catch up.

Greeves: My biggest concern is how the yet-unmeasured challenge by the Japanese is met in the next 10 or 15 years. This country will be hard pressed unless we keep up with research and the ability to work together.

Also, the advent of the [personal computer] and the revolutionary effect it is having on workers will impact the industry. This interest in the [personal computer] will carry over into the work place and force nearly everyone to use them.

Notestine: The microcomputer will be the big deal of this decade. It will get people to use computers who never had exposure to them and will profoundly change expectations of how information can be processed.

The telephone and computer integration will also go through a great evolution. The time is coming when you will see 50 million telephone/terminals all trying to access data banks.

Maher: A lot of little things will change DP. Off-premise programming or telecommuting will happen, for instance. It may just be a way to alleviate personnel shortages and provide a low-overhead way of developing systems.

Baley: End-user computing, which is already going on, will be a major factor in the industry. Also, less expensive hardware may open other avenues of progress. ■

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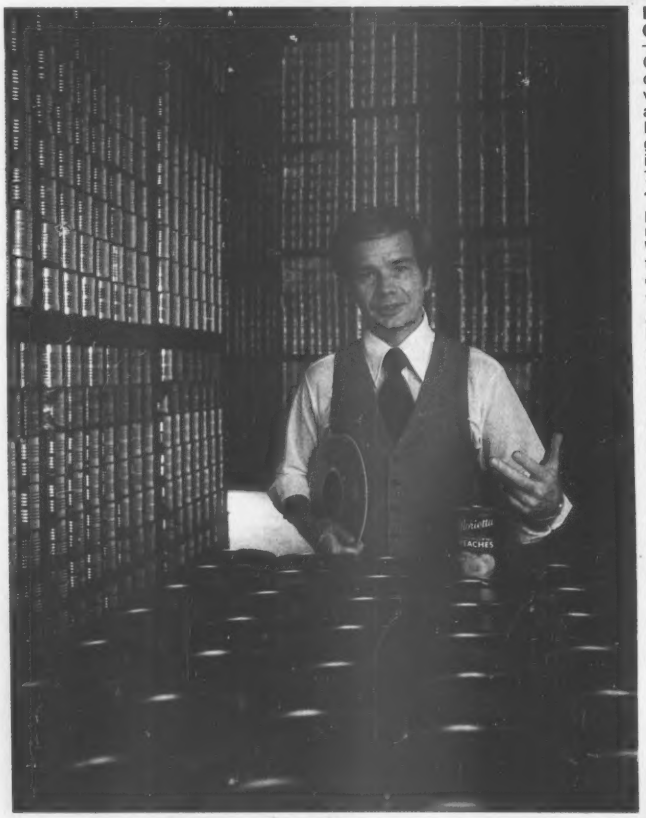

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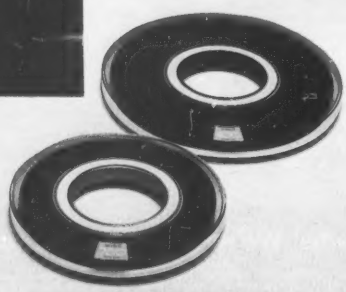

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Personal Computing in Big Business

No Turning Back

By Jeffry Beeler

Almost everywhere that personal computers are managing to gain a toehold these days management information systems (MIS) executives seem to be observing basically the same reaction: Once operations people overcome their initial reservations about owning and operating their own computing resources — once they take the microcomputer plunge — they seldom want or are able to return to DP business as usual.

What that enthusiastic user reception means for large corporations and their central computing departments is that personal computers are here to stay and that once they commit themselves to the machines firms can never turn back.

Although large mainframe-based data centers will almost certainly continue to exist indefinitely in one form or another, such facilities are steadily losing their distinction as the core of corporate decision making. In the future, traditional computing shops will be increasingly forced to coexist with more decentralized varieties of information processing built around personal microcomputers.

Thus, "DP managers and their departments can't afford to ignore micros and can't escape them," according to Dr. Richard Byrne, who teaches at the University of Southern California's Annenberg School of Communication.

For nontechnical end users, the arrival and widespread acceptance of personal computers on the corporate scene promises to produce a vast improvement in white-collar productivity. Dedicated micros also grant their owners a welcome measure of independence from large centralized computing departments, with their long response times, poorly designed systems and huge application backlogs.

But for DP managers and their organizations, the mass influx of business-oriented microcomputers has proved to be a decidedly mixed blessing and will almost certainly continue to do so in 1983. On the positive side, personal computers provide corporate computing departments with an "important opportunity to get out in the trenches, offer valuable services and get useful feedback," according to James Bandy, director of new-business development at Softec Microsystems, Inc.

"If computing professionals spent more time in operations where all the money that pays the DP salaries comes from, I think there would be a much better service done," Bandy said.

But although the advent of personal computers in the big-business arena has undoubtedly presented DP managers with some significant opportunities, the phenomenon has also confronted the

(Continued on Page 22)

Jeffry Beeler is a Computerworld *West Coast correspondent.*

(Continued from Page 21)

computing-shop heads with some new, unprecedented challenges. To encourage as much standardization as possible among a company's microcomputer products, DP managers need during the coming year to acquire new management skills without losing any of their existing technical know-how. They particularly must learn how to establish themselves among their firm's personal computer users as in-house technical consultants, according to PDC Systems, Inc. project manager Ronald Kagan.

During 1983 DP managers also need to create new, innovative channels of distribution that simplify the introduction, installation and support of personal computers in big corporations. One such alternative method of distribution calls for the creation of "in-company computer stores" that would allow firms to do for their own employees what retail store chains are already doing for the public at large. The stores would stock a variety of company-approved microcomputer hardware and software and then provide in-house users with the necessary support and training, according to Future Computing, Inc. head Portia Isaacson.

Whether DP managers prosper or languish next year in the face of the personal computer revolution depends to a great extent on how they play their cards. If they ignore today's microcomputer invasion and neglect to make the necessary adjustments, DP managers could soon find themselves "out of synch" with the rest of their organizations, PDC Systems' Kagan predicted.

"They will either be slow to respond to their users' changing technological needs, or they will introduce technology that their companies can't use," he said. "Either way, the results could be disastrous because the firms will be behind the times or will be misspending funds."

If, however, DP managers accept the widespread use of personal computers as an inalterable fact of life and position themselves accordingly, the payoff could be huge. Managed effectively, big business' growing acceptance of microcomputing could place the heads of large, centralized

'Whether DP managers prosper or languish next year in the face of the personal computer revolution depends to a great extent on how they play their cards. If they ignore today's microcomputer invasion [they] could soon find themselves "out of synch" with the rest of their organizations.'

Firm Makes Efforts to Spur Micro Use

About a year ago, General Dynamics Corp. of St. Louis embarked on a two-pronged effort to spur increased personal computer use within its various divisions. In doing so, it joined the ranks of many companies presently engaged in bringing personal computing to end-user departments.

One part of the firm's program, whose impetus came from high levels of nontechnical management, was designed to give the company's employees strong incentives to buy their own Apple Computer, Inc. computer systems and use the machines strictly in their homes. As part of the arrangement, the firm negotiated a volume purchase agreement that has allowed novice users to acquire their personal computers at "substantial" discounts, according to Harold McBeth, director of General Dynamics' hardware/software plans and controls.

The other part of the company's effort to promote increased personal computer use involves the large-scale installation of Apple IIs and IIIs within the corporation's own offices. After General Dynamics buys the machines centrally, they are redistributed to the firm's general managers, who in turn decide which employees will receive the computers and how they will ultimately be used.

One of the program's main objectives is to educate General Dynamics' non-DP employees about what personal computers can and cannot do and how the machines can simplify their owners' work. In the end, the resulting increase in computing literacy and expertise is expected to boost the company's productivity significantly, especially among its engineers and financial people, McBeth said.

Since the microcomputer acquisition effort's inception, about 280 of the very small systems have found their way into General Dynamics' U. S. branch offices. And, in 1983, the company's rate of personal computer installations is likely to be at least as high and probably higher, McBeth predicted. ■

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"When you enhance Lanier products, how do I know you'll anticipate what my users need?"

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data facilities in an ideal spot to shape and guide their companies' technological futures, Future Computing's Isaacson said.

The adoption of business-oriented personal computers could also thrust DP managers into a position of greatly expanded stature and authority within their organizations. "Micros provide DP managers with a way to make their kingdoms a lot bigger and better," Isaacson said. "With micros, these people can be real heroes, the ones who bring new technology into their organizations, dispense it, make it friendly and show their corporations how it can be used to speed information flow and ease management burdens."

Although personal computers have burst onto the DP stage only fairly recently, the machines are already fundamentally changing the way big corporations store, process and distribute their vital business data. Not too long ago, a typical Fortune 1,000 company controlled its computing-related activities almost completely from one central location.

But today, the old rules of the business information-processing game no longer entirely apply. Now, more than at any other time in DP history, computing power is increasingly migrating from the U.S.'s big, mainframe-based data centers and is finding its way at an accelerated pace into the remote corners of corporate operations.

This dispersal of information processing resources into the hands of nontechnical end users has confront-

(Continued on Page 24)

Selective Support Works Against Waste

One of the surest ways to minimize personal computer waste in large organizations is for corporate management information systems (MIS) executives to engage in selective support.

In theory, the idea works as follows: Data center officials first identify the microcomputer products they would prefer their users to acquire. The approved systems should be different enough in their features and capabilities to meet a broad range of user needs. Corporate computing personnel then buy the designated models in large enough volumes to qualify for quantity discounts and offer to make the products available to end users with full training and support.

At the same time, central DP also announces its refusal to support any personal computer offerings not on the approved purchase list.

The advantage of selective support is twofold, according to James Bandy of Softec Microsystems, Inc. It effectively limits a company's variety of microcomputer hardware and software by offering users strong inducements to acquire only approved models. And it still provides enough flexibility to allow users with a genuine need for nonstandard equipment to buy it, although they will have to arrange for their own training and support, Bandy noted.

Another technique that DP managers can use to minimize personal computer waste is to hold regular in-house seminars that explain exactly what business-oriented micros can and cannot do.

"The organizers have to take great care not to use the seminars as a means of discouraging the participants from acquiring their own machines," Bandy warned.

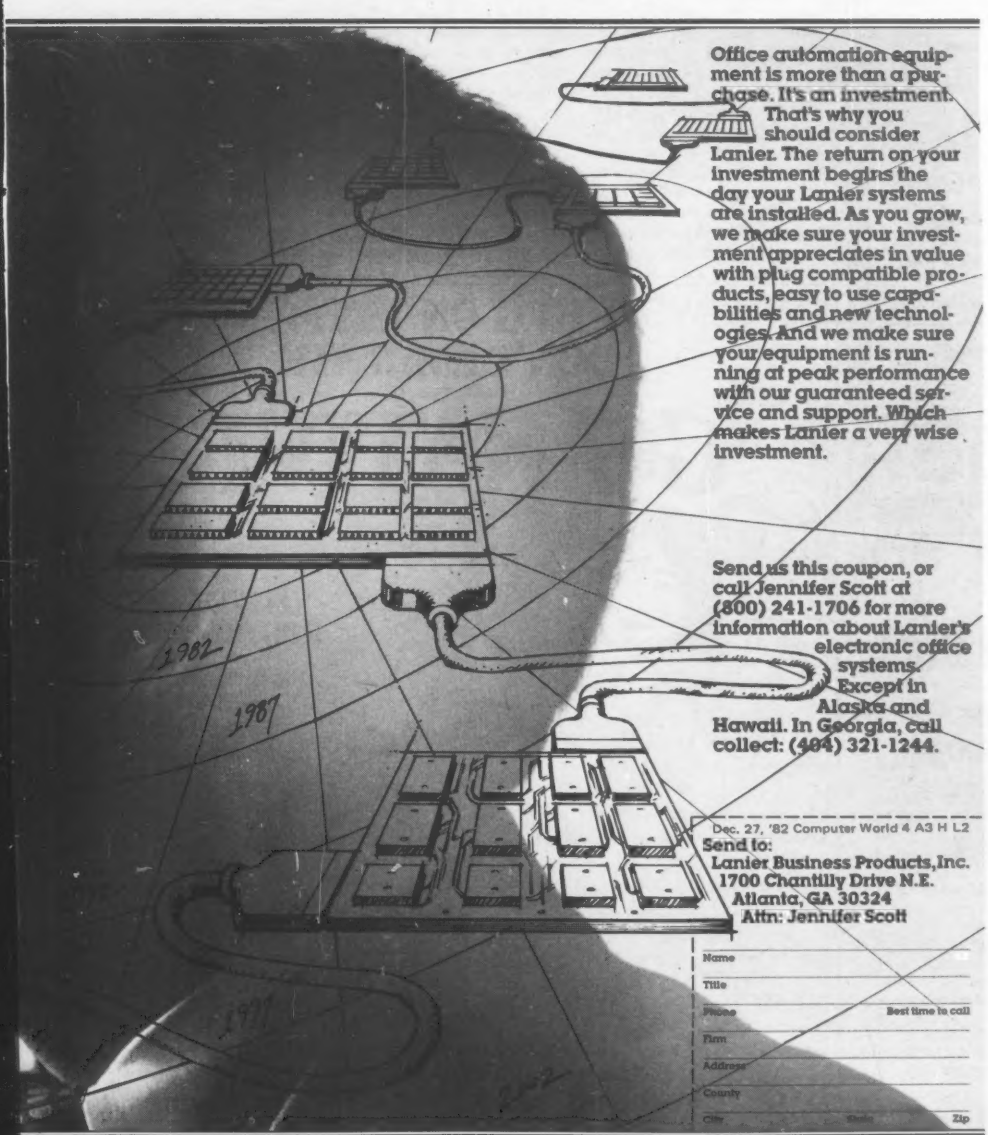
On the other hand, he added, DP managers need to explain to the prospective users that adherence to corporate purchasing guidelines will enable them to preserve their investment in existing software even if they someday upgrade to new hardware.

Project manager Ronald Kagan of PDC Systems, Inc. offered a third way of enforcing companywide standards and thus avoiding personal computer incompatibilities. Kagan recommended that DP managers play a central role in forming in-house "user communities." In essence, the communities serve basically the same purpose as users groups: They provide members with a ready-made vehicle for exchanging programs, technical advice and information about common professional concerns and interests, he pointed out.

For DP managers, the benefits of becoming deeply involved in user-community business are many. Participation in the communities allows data center directors to assess the needs of their personal computer users first hand. The involvement also places DP managers in an ideal position from which to dispense much-needed technical advice and information.

"If corporate MIS executives seize the initiative in forming user communities and can keep themselves at the center of the groups' activities, they will greatly increase the likelihood that their recommendations [to their clients] will be readily heard and accepted," Kagan said. ■

"Increase in value."
Tom Anderson, National Marketing Manager, Electronic Office Systems Division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(Continued from Page 23)

ed DP managers and their departments with a number of serious problems. One of those difficulties is that the influx of personal computers into field locations has proven virtually impossible for data center personnel to halt or even limit. Central controls on microcomputer acquisitions have been notoriously easy for determined end users to circumvent, according to Steve Kleiner, director of network design for E. I. Du Pont de Nemours & Co.

Another problem stemming from the diffusion of corporate computing power is that the staggering variety of commercially available microcomputer products has greatly hindered DP managers in their efforts impose and enforce companywide standards. Allowed to continue indefinitely, the absence of standards could eventually leave businesses with a confusing hodgepodge of competing hardware and software offerings, each unable to communicate with all the others.

'In the nether regions of the big-business hierarchy — the realm where personal computers are increasingly making their presence felt — the influence of high-level MIS executives is strictly limited. The reason is that their global style of management thinking is usually ill-suited to the specialized needs of managers and their staffs at the operations level.'

To sidestep the problems of product incompatibilities and other microcomputer-related pitfalls, DP directors during the year to come will have to fundamentally rethink their management strategies and their role in the overall corporate scheme of things.

Until fairly recently, DP managers enjoyed almost exclusive control over their companies' computing resources. As the business world's information processing elite, they directed all in-house programming and system development activities and oversaw all major hardware and software purchases.

Today, DP managers still wield a high degree of decision-making power, at least in the large systems sector of the corporate computing world. But in the nether regions of the big-business hierarchy — the realm where personal computers are increasingly making their presence felt — the influence of high-level MIS executives is strictly limited. The reason is that their global style of management thinking is usually ill-suited to the specialized needs of managers and their staffs at the operations level, Softec Microsystems' Bandy explained.

Assume New Role

So to deal effectively with personal computer users and their concerns, DP managers have to drop their usual insistence on tight systems control and instead assume the role of technical helper and advisor, Kagan said.

Although DP managers can recommend the purchase of one model of microcomputer hardware or software over another, they should resist the temptation to try to limit the flow of incoming systems to a preset volume. They should also avoid trying to tell their new-found "clients" what their problems are.

'Instead of imposing their product preferences and other preconceived notions on the users they are supposed to be serving, DP managers should focus their personal computer energies on trying to avoid waste and eliminate system incompatibilities.'

"People who work in the big corporate data centers are frequently so far removed from the operations side of the house that they don't have a very clear idea of what the nontechnical personnel truly need." Instead of imposing their product preferences and other preconceived notions on the users they are supposed to be serving, DP managers should focus their personal computer energies on trying to avoid waste and eliminate system incompatibilities, Bandy said. ■

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The New End User

Less Fear, More Savvy

By Catherine Marenghi

Revolutions have a way of happening without their key players being aware of it.

While the French revolution was bubbling like a pot about to boil over, Louis XVI recorded a single word in his diary every day: Rien ("nothing"). To his mind nothing was happening at all. Marie Antoinette acknowledged that something was amiss, but "Let them eat cake" was not the right approach.

In today's white-collar world, there is a cultural upheaval under way (and white-collar professionals do represent a culture). That change has been spurred by the introduction of small computers, personal data bases and even DP-inspired methodologies to the traditionally non-technical recipients of DP services known as end users. End-user computing has been hailed as a revolution. But, like Louis XVI and Marie Antoinette, the end users may be the last to know.

In the past, the end users have been forced to depend on the technology-rich DP technocrats for crumbs of information — usually delivered in indigestible form. The technocrats protected their glass-enclosed, raised-floor kingdoms by building formidable moats called application backlogs — successfully discouraging any contact from the technology-starved technopeasants.

Now end-user computing is creating a bridge between technopeasants and technocrats. And the push is coming from both sides. Out of this process will come a new breed of end user: fearless and sophisticated, largely self-sufficient, forming a fruitful partnership with DP.

This new breed of end user hasn't emerged yet. Nor will it ever emerge, if management information systems (MIS) types disregard the rapidly swelling numbers of personal computers as if to say, "Let them eat cake."

Who Are End Users?

End users have always been defined in terms of what they are not: computer professionals. That definition gets tricky, though, when you find general managers, accountants, clerks and even top executives writing programs in fourth-generation languages, fingering touch-sensitive screens and drawing up data models for their enterprises.

There is no such thing as a "typical"

(Continued on Page 26)

Catherine Marenghi is senior editor/features at Computerworld.

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end user. Amy Wohl, office automation guru and president of Advanced Office Concepts Corp. in Bala Cynwyd, Pa., sees end users reacting to automation on three levels.

The first level is characterized by enthusiasm and overwhelming acceptance of personal computing technology and automation. "Given the opportunity to use reasonably friendly technology, some percentage of office workers will respond very positively — in fact, they will get overly involved and waste time writing programs that already exist," Wohl explains.

In the second level, users will simply discover that the technology does what they want it to do and casually accept it. But, only "if it is easy to use, useful and introduced carefully," Wohl continued.

In contrast to the other two groups, however, the third group consists of "a substantial — but decreasing — number who want nothing to do with it [automation], either because it is bad technology or badly introduced or not useful for the amount of training required to learn it," the office automation expert said.

Socially Acceptable

Wohl sees more and more end users shifting from the third category into the first two. The reason? "We're getting smarter about how to introduce computing, and the machines are getting better. Also, there is a whole social milieu developing around personal computers. They are now an accepted part of an affluent, middle-class consumer culture," she explained.

No one doubts that end-user resistance to computing is still strong. However, the nature of that resistance is changing. Gordon Lippitt, behavioral science professor at George Washington University and president of the Bethesda, Md.-based Organization Renewal, Inc., sees more tolerance and recognition of the need for computing among end users and more acceptance of its inevitability. However, "we are seeing today a greater percentage of resistance *not* toward computers and word processors in and of themselves, but toward the consequences of computing."

Lippitt defined those consequences as "increased feelings of isolation from interpersonal relations, lessened social interaction and a feeling of being more remote from the point of decision making." The organizational behaviorist, who makes a business of "auditing people's feelings," sees continued end-user resistance to those consequences, rather than to the installation of machines themselves, and believes that organizations are only now beginning to learn how to cope with those consequences.

Not all applications are suitable for end-user computing. Large transaction-oriented functions like payroll and corporate accounting are obviously best left to DP. But for those applications that are appropriate for end users, such as decision support systems (DSS), financial modeling systems, forecasting, on-line queries and ad hoc analyses, the key element is the user/machine interface.

Just as many programming staffs have superstars whose productivity is double or triple that of their peers, many end-user staffs have "quick studies" who can master programming languages at the blink of an eye. These people are not the problem. The main challenge is to develop elegant, human-factored languages and tools tailored to those who are not inclined to learn much about them. Computing should be as easy for end users to master as the telephone, and the human interface

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What Comprises Friendliness In a System?

While plenty of vendors claim their products are user-friendly, that promise is only beginning to be made good. Amy Wohl, president of Advanced Office Concepts Corp., pointed out that some systems are friendlier than others, but none are consistently friendly. Her criteria for friendly office systems:

- Menus and prompts — it would be especially helpful to be able to customize these, Wohl noted.
- "Soft" or programmable keys.
- Built-in training aids.
- On-line Help facility.
- Partitioned screens, so that the user gets only the required functions.

Wohl cited Xerox Corp.'s Star system for ease of use and its attempts to provide tutorials, but warned that "it takes too long to do things, and the overhead is costly." She went on to cite Hewlett-Packard Co.'s Office System for its soft keys and Exxon's Office System 5000 for its menus.

Grid System Corp. offers a system with an easy-to-learn interface and a single set of consistent alphanumeric commands, but that still requires end-user training, she added. ■

should be as friendly.

Larry DeBoever, director of data base products for Computer Corp. of America, Cambridge, Mass., has described user-friendly tools as a "myth" [CW, Aug. 23]. "The tools that are universally described as easy to use are not. Most likely they are easy to learn, which means that end users must still learn a syntax," DeBoever wrote.

What is required of a truly user-friendly interface? DeBoever offers the following criteria:

- Browsing capability. Today's line managers are already inundated with information, and they need the capability to slosh around for the data they need.
- No need to learn a syntax. Because browsing is visually oriented, the user needs to be able to scan, say, a financial graph and zoom into increasing levels of detail — without having to type commands.
- Access to real production data, and not merely extracts of that data provided by programmers. End users need timely and complete data for ad hoc analyses. The solution, DeBoever argues, is integrated corporate data bases.
- No need for typing. Voice recognition systems and menu-based systems with programmable function keys or "soft keys" are a step in the right direction, but there are trade-offs: these interfaces typically preclude ad hoc inquiry and browsing, DeBoever noted.

Weighing Trade-Offs

Clearly, there are trade-offs involved in all the so-called user-friendly tools and systems, and the decade ahead will see a continual refinement in their ease of use. The tools that succeed will be those that best fit the end user's way of working, with minimal trade-offs and adjustments, according to Philip Rothenstein, vice-president of public finance for New York-based First Boston Corp.

Rothenstein has had several years' experience in computer services and internal time-sharing at his firm and has observed unilateral end-user resistance to the introduction of nonprocedural or "fourth-generation" tools. At First Boston these tools have included Focus from Information Builders, Inc., Cuffs from Cuffs Planning and Models Ltd. and Tell-a-Graf from Integrated Software Systems Corp.

"There is still too much handholding required with these [fourth-generation] tools," Rothenstein said. He compared them with Visicorp's Visicalc, the spreadsheet tool which he said "a guy can relate to" because it mirrors something a user would do with pencil and paper. He cited word processing as another successful application area because word processors imitate and improve upon what the writer or editor normally wants to do: "cut and paste" electronically.

The human interface will stand out as the key issue in system design and selection in the years ahead, often edging out price/performance considerations, and end users will have a prominent place in that decision-making process. As F.G. "Buck" Rodgers, IBM vice-president of marketing, puts it, the end user will be the "prime acquirer" of information systems by the end of the decade [CW, Nov. 29]. "The more the value of information is realized within a company, the more end users will have a say in which systems are appropriate," he added.

In many organizations, end users have struck out on their own and have purchased their own personal computing facilities. In others, the need for end-user involvement is first recognized by MIS management, which initiates the introduction of small computers, nonprocedural tools and Information Centers to ease the application backlog and improve productivity. Ideally, end users and DPers will be moving toward a partnership, shaped by the political factors and the culture of the individual organizations.

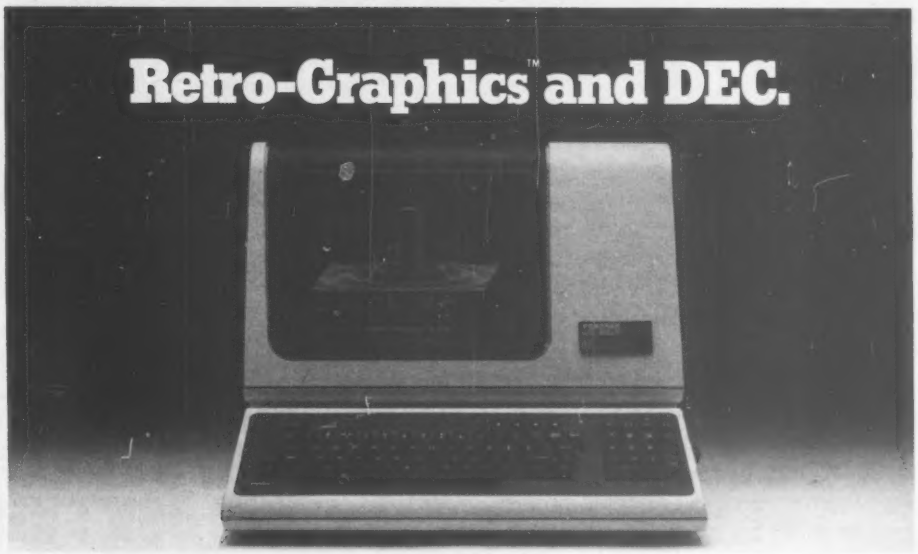
James Martin, in his book *Application Development Without Programmers*, urges the move toward end-user computing and application development where appropriate [Prentice-Hall, 1982]. He describes the major hurdle as a cultural barrier: "[End users] are mostly frightened of terminals and regard the creation of computer applications as a mystique entirely beyond their reach. Nevertheless, the best case studies of end users doing their own application creation are very impressive . . .

"Overcoming this cultural barrier is something that each organization has to confront on its own rather than waiting for any overall change in the computer industry," Martin added.

The first stumbling block in overcoming this hurdle is the tarnished reputation of most MIS departments. One approach is the Information Center, as espoused by IBM Canada, which creates a DP/end user liaison.

Clive Finkelstein, who developed the information engineering methodologies, stresses the need for creating an end-user/DP partnership and circumventing the political problems that surround MIS.

Waiting on the other side of the cultural barrier is a new and informed end user who will inspire new creativity in the application development process. ■



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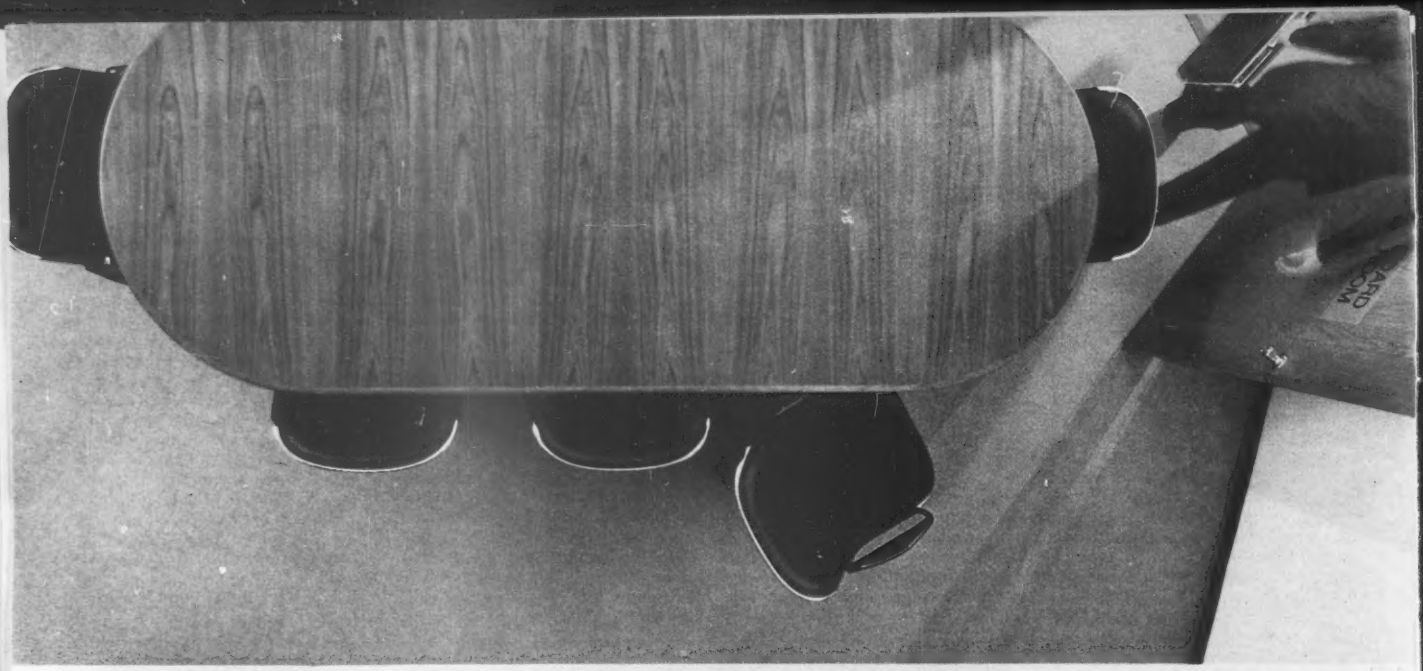

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Forecast '83

1983 Software Budgets

A Temporary Halt

By Lois Paul

After gazing into their crystal balls for clues about the 1983 economic environment, DP managers are opting for packaged software budgets that either mirror or only slightly increase their 1982 expenditures.

This was the word from 12 of the 20 DP managers across the country contacted in an informal *Computerworld* telephone survey.

"If I get one software package for next year, I will be lucky," observed Arthur J. Errickson, division manager of DP systems for Frederick Atkins, Inc. in New York. "I am going to make it with what I have for next year." Errickson gave his purchased software budget a minimal increase for 1983.

At the First Boston Corp., New York investment brokers, "we're pretty much leveling off, which I thought would never come," said Joseph Licata, vice-president of data processing. He anticipated an increase of about 20% in expenditures for packaged software next year, an increase smaller than in previous years, when the firm acquired large packages such as data base management systems or telecommunications software.

While the economy has been a factor in shaving increases in software expenditures, few of the DP managers contacted laid the blame there directly. Only John C. Murray, corporate director of the data center for Damon Corp. in Needham Heights, Mass., admitted that his firm has an ongoing austerity program for fiscal 1983.

There is hope that the economy will improve next year, "but in anticipation we are cutting our budget." Accordingly, Murray's budget for systems and applications software will rise 10% to 15%, an in-

(Continued on Page 32)

Lois Paul is Computerworld *senior editor/software.*

Experts See Big Push for Packaged Software

According to the experts, DP managers will be turning in droves to packaged software in 1983 for canned solutions to problems that would be too expensive to develop in-house in a difficult economy.

However, the majority of the DP managers contacted by *Computerworld* recently in an informal survey indicated that their expenditures for software packages will be flat or only slightly increased next year.

Stressing that packaged software is the ideal solution for the harried DP manager who is asked to tighten his belt but meet ever-increasing demands from end users, the consultants and industry analysts admitted that most software package purchases next year will be in the minicomputer and microcomputer classes.

This may be the reason for the divergent viewpoints. When talking about expenditures for packaged software, the DP managers surveyed by CW spoke almost exclusively about mainframe software — the "big-ticket items" that would absorb the largest piece of their budget.

"I see next year being an absolutely banner year for packaged software," Herb Gepner, software analyst for Data Decisions in Cherry Hill, N.J., said. "I don't see the economy changing very much — not too quickly — in spite of everything the government is predicting. If we do come out of the recession, it will be sometime late next year. During that period of time, the activity is going to be in the purchase of software."

Gepner conceded that the economy could slow down these purchases, particularly when they involve mainframe packages. "It may have an adverse effect on data base management systems and large sophisticated packages or systems along that line," he added.

It is the mini and micro arenas in which Gepner sees purchase growth. When it comes to mainframe packages, applications software should fare well, however, because "there are always changes in the governmental requirements. There are always people who are still working with antiquated accounts payable and general ledger systems," Gepner said.

International Data Corp. (IDC) of Framingham, Mass., is projecting an increase of 32% in the value-added software marketplace in 1983.

"That is pretty good growth in an economy where there is probably going to be a shakeout in the desktop market, where there already is a shakeout in the minicomputer market and where every major hardware vendor around (with the exception of Wang), as far as I can tell, is laying people off or at least freezing hiring," Carol Weiszmann, IDC director of research, noted.

"Everything is just in a holding pattern, and I think it is going to stay there for at least the first half of '83," she added.

Warren Culpepper, president of Culpepper & Associates, a Georgia-based consulting firm, expressed optimism that expenditures for packages are going to increase. "Mainframe buyers will be looking to software companies more than ever for solutions to their problems," Culpepper said.

In systems software, he said, this represents no more than a continuation of the general trend: "No one is developing his own systems software, of course." However, in the applications area, it represents a shift from in-house development to purchase of products from outside sources, particularly during 1983.

"Budgets are squeezed more than ever, people are very tight on the personnel they can have in-house and needing better solutions. So there seems to be but one reasonable alternative — that is more outside applications software," Culpepper observed.

Max Lebow, software editor of Datapro Research Corp. in Delran, N.J., predicted that "the economy as a whole will probably dictate moderation in software purchases."

Lebow suggested that the price of applications software packages will come down because of advances in systems software. "It just isn't going to cost as much to move software from one machine to another," he explained.

Many DP managers may turn to applications generators to develop their own in-house applications programs rather than resorting to the package alternative, Lebow believes.

Lebow also thinks that end users may play more of a part in the purchase of packaged software than they have in the past. If end-user departments are claiming part of their budgets, this could explain to some extent why DP managers have less to spend. ■

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Four Companies Budget More for Packaged Software

Major increases in expenditures for packaged software are planned in 1983 for four of the 20 firms surveyed recently by *Computerworld*. In all four cases, the firms are working from a very small base of packaged applications software and are in the process of beefing up their libraries of canned products.

Helene Curtis Industries in Chicago, for example, is looking at an increase of about 50% in packaged software spending in 1983. "Most of the increase is in applications software," said Ed Valliere, director of data processing.

"There could be some systems software increase in that we might be going to VM. That will incur some extra cost for us," the DP director added.

Valliere purchased a general ledger package last year and now is looking for a human resources management product. The general ledger package represented the firm's first purchase of applications software, bringing quite an increase in the packaged software budget from 1981 to 1982.

'ITT is working from a "fairly low base" in terms of applications software. This and the quality of the packages available prompted [the company's director of corporate information systems] to project between a 90% and 140% increase in expenditures for applications software in 1983.'

The economy has not affected Helene Curtis, according to Valliere. "The shampoo business is good," he said. "It probably is one of our record sales years in profits."

New England Business Services in Groton, Mass., is anticipating a 100% increase in its packaged software budget, mainly because the firm has purchased very little outside software in the past.

"Also, some of these packages are of the larger scale," Kenneth R. Canaway, director of corporate data processing, said, noting that over the next couple of years the firm expects to spend about $200,000 on packaged software.

J. Henry Schroder Bank and Trust in New York also expects to increase its expenditures for packaged software about 100%. The reason: "We are bringing in all new applications," explained Alfred A. Milici Jr., vice-president of information services.

This trend began in 1982 for the bank, which will make the bulk of its acquisitions in 1983. The acquisitions will include both applications and systems software.

"We will at least double our expenditures in 1983 over 1982 for applications software," said Colin F. Bate, director of corporate information systems for ITT in New York. "There is no question about that because of the different acquisition mode we are now in with regard to software."

Bate said ITT is working from a "fairly low base" in terms of applications software. This and the quality of the packages available prompted him to project between a 90% and 140% increase in expenditures for applications software in 1983. ■

Two Firms Budget Nothing for Packages

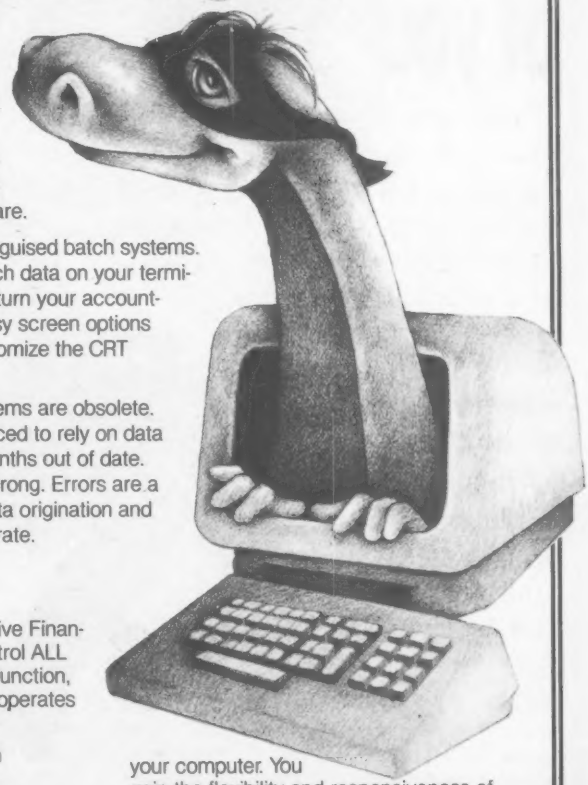
Two of the 20 DP managers contacted during *Computerworld*'s recent informal poll about software budgets have no budget at all for packaged software in 1983.

For one manager, the reason was a totally in-house software development system. The tendency to write homegrown code was also a factor for Herb Parsons, DP manager for Armatron International, Inc. in Melrose, Mass.

However, Parsons' firm made an exception last year and purchased a canned fixed-assets system. "This year I don't see us purchasing anything else," he said.

Only two of the 20 firms contacted during the survey cited a decrease in packaged software budget figures in 1983. Both indicated that the economy was not the factor. Instead, they said, the cutbacks resulted from the idiosyncracies of the individual businesses and their cycles. ■

Real Time Financial Software Or A Dinosaur In Disguise?



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A Temporary Halt

(Continued from Page 29)

crease similar to last year.

Robert Bernard, director of management information systems for Engelhard Corp. of Carteret, N.J., said his 20% increase for packaged software reflects his firm's planned installation of an IBM 3083 in 1983. Moreover, Engelhard currently is going through a DOS-to-OS conversion.

"The economy is really not a factor as far as operating packaged software goes," Bernard said. "The purchase of software pretty much has been in line with planning."

In terms of applications software, Engelhard has relied mainly on homegrown code. An "advocate of packaged software," Bernard will be looking in this direction in the future.

GATX Corp. of Chicago will show a decline in packaged software as a percentage of its total software development activity in 1983, according to John W. Edwards, the firm's corporate director of information systems. "The purchased software represents an incremental cost for us, whereas relying on our own development we can tend to work with existing resources," he explained.

The firm will spend roughly 60% to 70% of its software budget on internally developed software and perhaps 30% to 40% on purchased software. "There will be more emphasis on things like productivity tools and software packages like that than on completed systems," Edwards noted.

The decline will be felt most sharply in applications packages. "In the area of systems software, I expect our expenditures may be up slightly. In applications software, they will be down," Edwards said.

The opposite will be the case at Fireman's Fund Insurance Co. of San Rafael, Calif., according to Jerome Sommerhauser, senior vice-president of systems. Applications software will be up considerably (in excess of 30%) and systems software will be down from 1982 figures.

"Basically, we are not going to convert to [MVS] XA next year. We are pretty much converted on the [IBM] 3081. We don't see a big increase in either numbers of CPUs or performance software," Sommerhauser said.

The increase in the applications software budget will total about $750,000 and will mainly be used to provide software to handle new processing requirements for a Fireman's Fund subsidiary.

Sommerhauser said the economy had "a lot [illegible]" with the firm's postponement of conversion to MVS/XA in 1983: "It would be a big, big conversion for us." However, Fireman's Fund did not hold off on buying packages in 1982 because of the economy. "Anything we can buy, we'll buy, as opposed to making it. It is always a lot less expensive. If we can find something that fits our needs, we'll always buy," he added.

Jewel Companies of Chicago is one of four firms that anticipates its 1983 budget for packaged software will be about the same as that of 1982. According to Steve Adams, corporate vice-president for information services, the leveling off is not a result of decreases in activity but because the company purchased a lot of software in 1982 to handle a newly installed centralized system.

Bruce G. Curry, staff vice-president of management systems and services for Hertz Corp. in New York, expects 1983 to be a "very flat" year in terms of packaged software expenditures. One reason: No major replacement projects are under way because of belt-tightening in the face of a heavily competitive year.

In addition, the existing major software packages are in place at Hertz and do not require much modification. "The effort to upgrade, from a cost standpoint, would not be warranted," Curry said. ■

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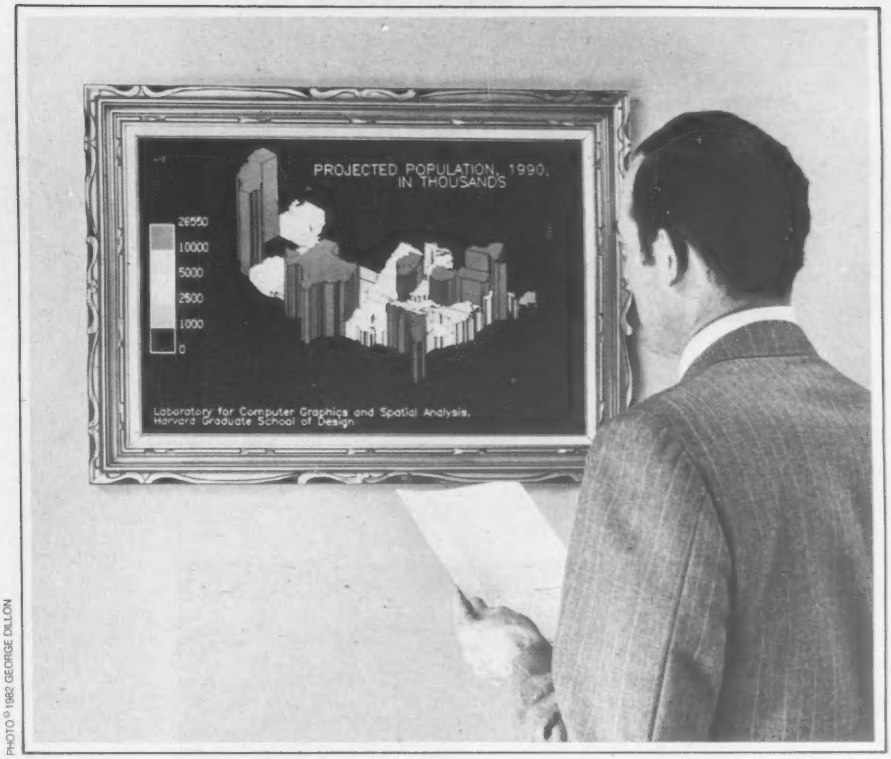

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Business Graphics in '83

Art For Art's Sake?

By Jim Bartimo

A speaker at a recent conference on computer graphics walked to the podium to present an unusual application. Attempting to illustrate population changes, he had manipulated a map of the U.S. so that some states swelled out of proportion and others atrophied into a shell of their former selves.

The audience reacted negatively. And its reaction was as predictable as the map was unreadable.

The graphics served not as an easy-to-read version of complex statistics, but rather as art for art's sake.

In this case, the graphics were apparently employed only for graphics' sake. Nevertheless, many businesses are finding that graphics can indeed simplify and condense reams of computer printouts.

There is no doubt that the computer graphics market is growing. In fact, the total graphics marketplace is expected to increase by 35% per year, making it a $4.6 billion dollar industry by 1985, according to graphics consultant Carl Machover.

The reason for this rapid growth and industry optimism is simple. It is easier to identify trends by looking at a graphic than by looking at figures. For instance, trying to compare a West Coast company's sales figures from 1975 to 1982 with those of its closest competitor could make for a sizable computer printout. But a single graph, if done correctly, could cover all that information and more in a single glance.

While the total graphics market often includes such vertical applications as computer-aided design and manufacturing (CAD/CAM) and medical and geographic applications, the largest boom in graphics is expected to occur in business applications — an area with as many potential users as there are DP shops. In fact, The Yankee Group predicts that by 1985 the business graphics market will be worth about $3.3 billion.

Getting Graphic

Various types of graphics — from three-dimensional images to cartography — could be referred to as business graphics, but for the coming year it is safe to limit traditional business graphics to bar charts, pie charts, graphs, word slides and perhaps a few other basic formats. Donkey Kong, Tron and even some television commercials are computer-produced graphics, but they are technologi-

(Continued on Page 34)

Jim Bartimo is a Computerworld *senior writer.*

(Continued from Page 33)

cally more sophisticated than the type of graphics likely to be seen in the boardroom.

There are three basic uses for business graphics:

- Among peers, where rough graphics are acceptable.
- For formal presentations, which demand high-quality, more polished graphics.
- For on-line applications, such as decision support systems (DSS).

Rough graphics, or peer graphics, is characterized by slightly jagged lines and letters of less than typeset quality. As the term implies, high resolution is not necessary when presenting figures to one's co-workers and immediate supervisor.

Peer graphics is expected to become a high-growth area in the coming year, but probably not as strong a growth area as the next level of graphics quality, referred to as presentation graphics. This type of graphics is characterized by clear, sharp images and high-quality lettering.

While peer graphics might include color, presentation graphics is almost certainly in color and almost always prepared for meetings with the chief executive officer or the board of trustees.

Presentation graphics is likely to be one of the higher growth areas in 1983, based on figures from a 1980 study conducted by International Data Corp. (IDC), which found that 85% of the people in management in-

Which Terminal Technology Will Survive?

Because it is a truism that if the graphics can't be presented, then the concept is worthless, the driving force behind business graphics is the CRT terminal — loosely defined as the workstation on which the actual graphics are created.

In a 1981 study, International Data Corp. (IDC) predicted that unit shipments of graphics CRT terminals will grow in dollars by 28% until 1985, when sales will total $1.3 billion. The active growth in this market is likely to determine through natural selection which technology will survive.

A struggle over which terminal technology — raster or stroke — will be most accepted by users is currently under way. Raster technology refers to a constant left-to-right scanning by an electronic beam, which draws lines by lighting specific points on the screen while scanning. Stroke technology is more closely related to how an artist would draw a line — lighting up an area between two defined points.

Combining and perhaps confused with these two technologies is the refresh-and-storage method of image retention. A refresh terminal, such as the Digital Equipment Corp. VT 125, constantly redraws the terminal image, allowing the user to erase parts of the graphics. Storage terminals, such as the Tektronix, Inc. 4006, draw an image that must be changed by erasing and starting over.

A stroke-refresh terminal is usually referred to as a refresh terminal, while stroke-storage and raster-refresh terminals are called storage and raster CRT devices. A fourth technology is the plasma terminal, which uses an array of neon bulbs to produce images on a flat screen.

For business graphics, the user is expected to settle on the raster and refresh terminals and weed out the others. IDC predicted that 100,000 raster units and roughly the same amount of refresh terminals will be shipped in 1983.

The cost of these terminals has been dropping and should continue to do so in 1983. Refresh terminals can range in price from $9,000 to $50,000, raster terminals from $2,000 to $100,000. The advantages of low costs, good color and a low rate of "flicker" in its imaging will make the raster terminal a product to watch, according to graphics consultant Carl Machover.

Overshadowed by Micros?

But all this talk of terminals in business graphics may be short-circuited to some degree by the personal computer. While the quality level of microcomputer graphics is only at peer level today, the price of $5,000 or less for a complete graph-making system is attractive.

Software such as Visicorp's Visiplot makes it possible for the user to easily plot figures on a graph, and pen plotters for micros can cost as little as $1,000. Hardware costs encompass only the cost of the micro itself. Perhaps for these reasons, The Yankee Group predicts that personal computers will account for $622 million, or 19%, of the $3.3 billion business graphics market by 1985.

In the final analysis, the use and quality of computer graphics depends largely on who in the organization is creating them. Larger, turnkey systems are now ideal for end users in ad agencies and graphics art departments. Data base interfaces to a graphics program are more ideal for decision support. ■

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formation systems departments wanted business graphics primarily for management presentations.

The final and perhaps most tenuous application of computer graphics is for DSS. Because this burgeoning technology is aimed at the most persnickety of users — senior managers — this type of graphics will be derived from on-line information and will be available at the touch of a button or even the touch of a screen.

DSS graphics will obviously not develop faster than the growth of DSS itself, which is not remarkable now and is not likely to be in 1983. However, the president of Computer Pictures Corp., David Friend, believes DSS graphics "will be the highest area of growth in 1983" because it is the perfect solution to the inherent DSS problem of too much information in an unreadable volume.

The Graphics Picture

Terminals are not the only medium for viewing graphics. Again, it depends on the audience for the graphics. Peer graphics, for instance, are more likely to appear on a screen than presentation graphics, which commonly appear on a slide.

Slide preparation hardware is one of the limiting factors in business graphics. While everyone would like an attractive slide, not everyone is willing to spend from $1,000 to $300,000 for a slide maker, which must be used to produce thousands of slides to justify the expense.

Hard-copy output is as rich in technologies as it is in uses. On the high end of the scale, ink-jet and laser printers will yield presentation quality. On the low end, high-speed dot matrix printers will suffice for some peer graphics. But the latest trend in hard-copy output is the pen plotter.

There are two basic types of pen plotters: drum, on which the paper moves under the pen on a cylinder, and flatbed, on which the pen moves over the paper, mounted on a flat surface. Drum-type plotters range in price from less than $1,000 to about $250,000, while flatbed plotters can cost up to $150,000.

In another IDC report, released in 1982 and focusing on graphics in office automation, pen plotters were predicted to occupy 34% of the market by 1986. Surprisingly, impact dot matrix came in second, with an anticipated 21% of the market.

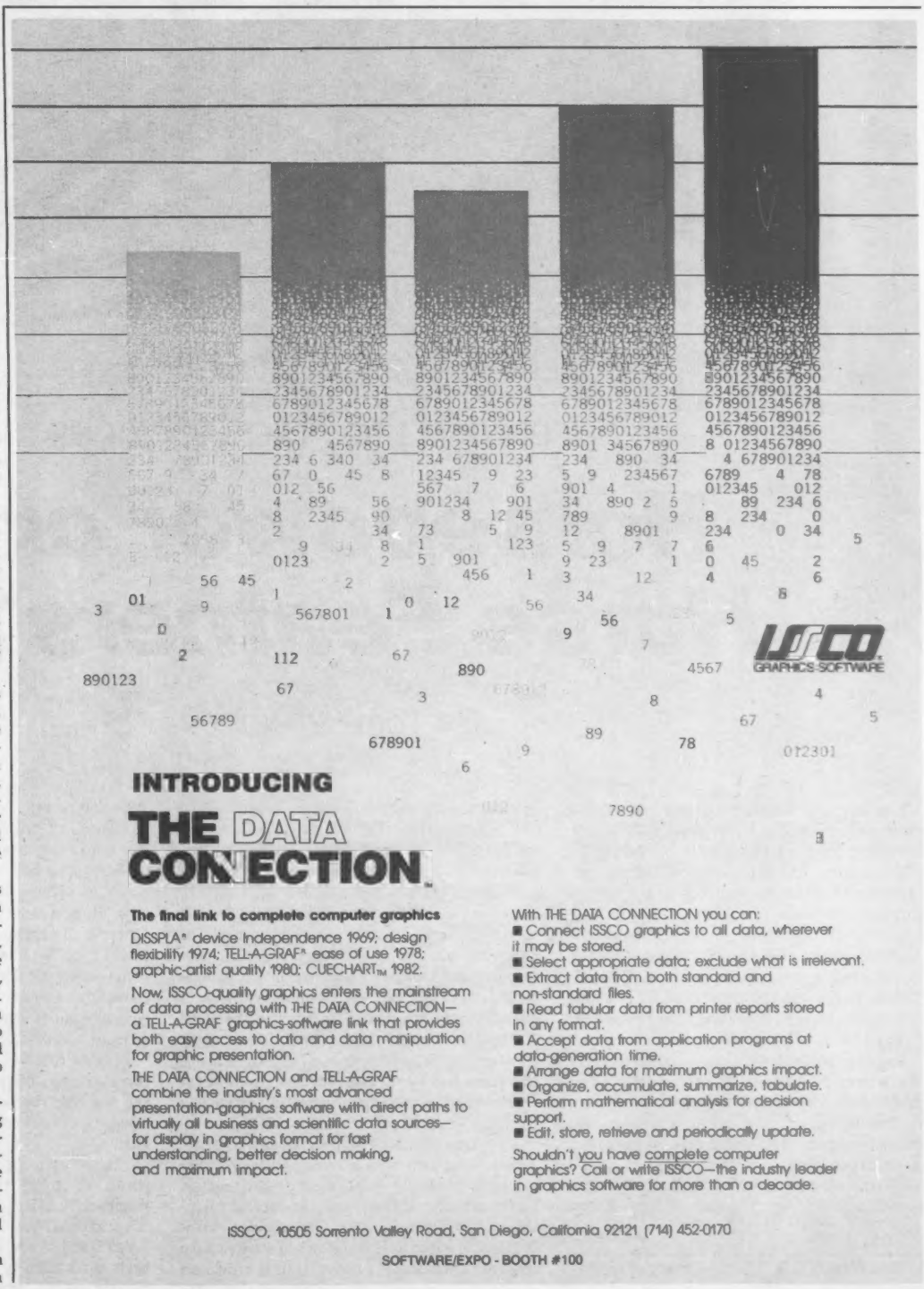
High hardware costs are a limiting factor in the growth of business graphics. But, like hardware in other areas of the computer industry, graphics equipment costs are coming down, consultant Machover said.

Ease of use is another factor that must improve before non-DPers turn to graphics for some answers, he noted.

The price of graphics software has also been a limiting factor. Graphics subroutines from vendors such as Issco, Inc. (Displa) and Precision Visuals, Inc. (Grafmaker) can run from $12,000 to $35,000. An alternative is graphics device drivers, which range from $1,000 to $5,000, but rely heavily on an expert programmer, according to Machover.

Perhaps the biggest software problem that has faced the graphics user is the inability to create a graph from information in the corporate data base without rekeying. However, the purchase of Computer Picture Corp. by Cullinane Database Systems, Inc., a mainframe software company, is expected to result in a marketable interface between the mainframe and the graphics terminal.

Despite the growth of computer business graphics, they are not as visible in the average DP department as figures sometimes indicate. Many departments now shy away from the technology because of its disadvantages. DP departments were generally established in the early '60s to deal with the proliferation of numbers on paper. Graphics will now help the DP department deal with the proliferation of computer printouts. ■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Benchmarking the Big Machines

Horsepower or Horse Feathers?

By Tom Henkel

Finding out what really goes on inside your processor has been described as everything from an exact science to a black art. Systems have become so large and complex that it is impossible to evaluate a computer system as a whole.

In theory, accurate performance information allows the DP manager to make the most of a processor's resources. In addition, performance information is vitally important for DPers deciding whether to expand or replace a system.

Experts in performance evaluation say the secret to processor rating is a keen understanding of the system's work load — knowing exactly what goes in and what is expected to come out. In complex multiprocessing, interactive and networking environments, however, the actual system work load at any given time can become somewhat abstract.

Traditionally, DPers have relied on benchmarks to evaluate a system's performance. But the word "benchmark" itself often defies definition — generally accepted definition, anyway.

Benchmark usually describes a set of software programs that theoretically represent the essence of how a computer system functions. But as Thomas Wyrick, a benchmark specialist with the Federal Computer Performance and Simulation Center in Washington, D.C., observed, the term has been used to describe everything from exacting scientific testing to playing around on various systems.

Proponents of benchmarks say a structured, scientific test is the only way to accurately measure processor performance. Furthermore, if they are conducted properly, benchmarks can provide a controlled, logical and defensible study of an organization's DP environment that can serve as a framework for current and future DP operations.

Critics of benchmarking maintain that the process is costly and time-consuming, and that it has been obsolete since the days of single jobstream batch processing. Bob Bolder, a researcher in Mitre Corp.'s Information Systems Department, said benchmarking techniques tend to break down when used with the complex operating systems, data base management systems and software that run on today's big systems.

Bolder further argued that today's systems are so complex, there is no guarantee a given benchmark will execute the same way each time the programs are run.

"It often costs more to benchmark [than to buy] the system," Bolder remarked, adding that aside from testing his current system, a DPer often does not have the luxury of performing extensive tests on a variety of processors before deciding which one to buy.

Tom Henkel is a Computerworld *writer/analyst.*

On the other hand, some researchers contend that carefully designed benchmarks can be extremely beneficial. Just using pilot tests — a representative jobstream — to test a computer's performance can often be worse than doing nothing at all, they claim.

Nevertheless, some form of benchmark appears to be the foundation of most vendors' claims for processor performance. IBM, for example, recommends a "full-function benchmark," or one that includes remote terminal emulation to host applications in data base and interactive environments, as the most accurate foundation for a performance evaluation.

Bill Fay, who conducts large system benchmarks at IBM's Gaithersburg, Md., System Support Facility, said a properly developed benchmark can often last the lifetime of a system and prove a great asset in deciding how to expand the system. In addition, Fay noted that if the user plans to investigate another vendor's system as part of an expansion program, it is often more practical, and certainly less costly, to convert a defined jobstream to the other vendor's operating environment.

Benchmarking Roadblocks

The biggest roadblock facing performance evaluators is the fact that no two DP shops are exactly alike. A benchmark that works well for one shop may be inadequate for another.

Furthermore, many DP shops simply do not have the expertise, or cannot devote the time, to develop benchmarks that are as exacting as, for one example, a chemistry experiment.

Few researchers will go as far as quoting a formula for evaluating performance. In fact, there do not appear to be any generally accepted ground rules to processor evaluation. Most evaluators are quick to caution that evaluation methods that offer formulas to determine quickly a processors' performance — like millions of instructions per second (Mips) ratings and the Fortran-based Whetstones — are unreliable and downright foolish if used as the sole evaluation method in determining which processor to buy.

Choosing the Right Mix

Choosing the right job mix is the most critical part of developing a benchmark. That process, Mitre's Bolder pointed out, requires an understanding of how an organization's system actually works. After the work load has been defined, there are many methods of calculating performance.

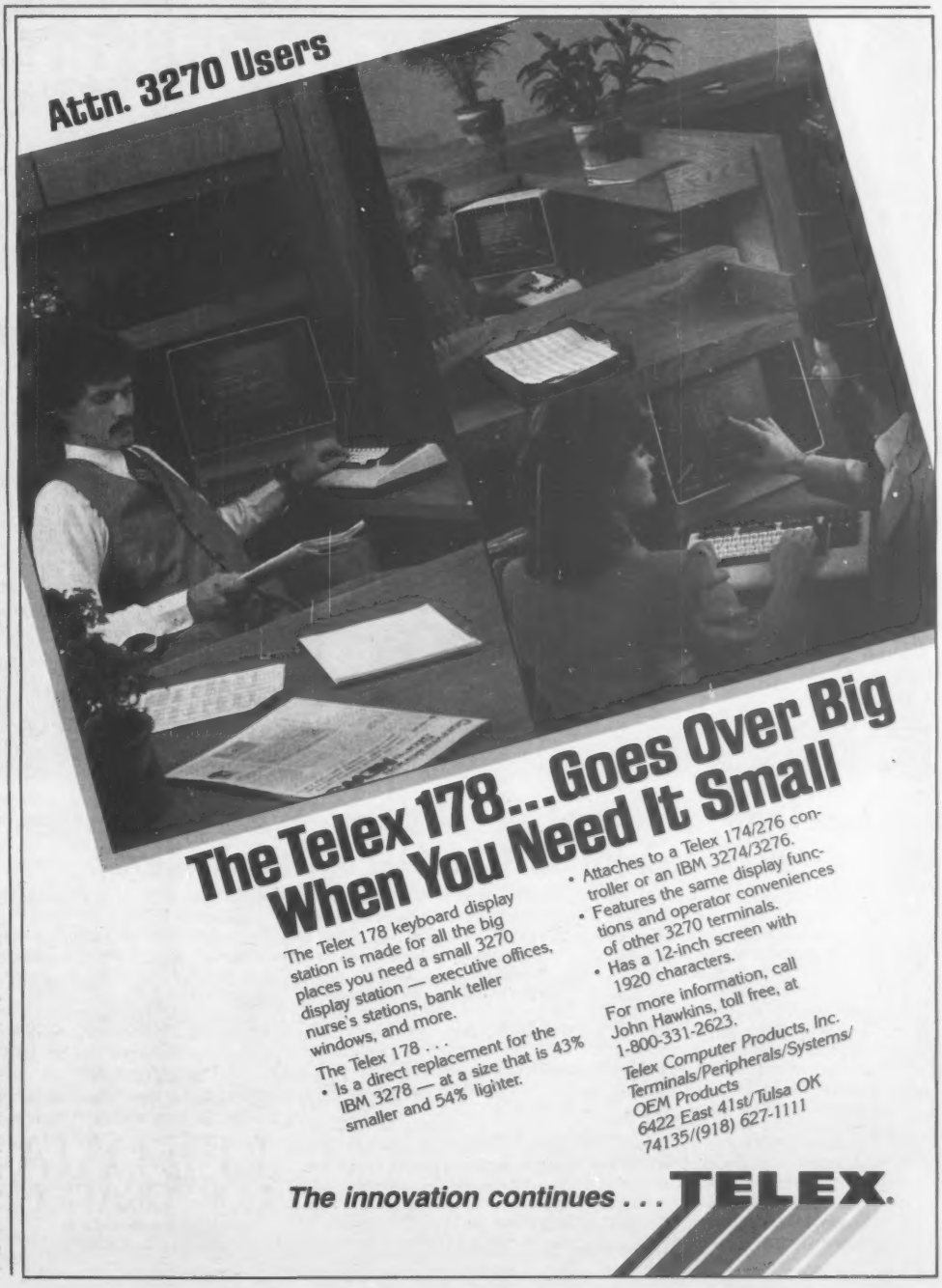
IBM's Fay, for example, noted that benchmarks can be developed to study a variety of factors including the elapsed time per job, the transaction response time and the number of jobs processed in a given time. Which factors are most critical depend on the individual application.

Unfortunately, simply benchmarking a computer system may not be adequate for those users attempting to get an idea of processor performance. Most large processors today have enough raw power to manage just about any application, Bolder noted. Just how efficiently the job gets done can often be a function of the operating system, applications programs and networking techniques used. To accurately test a system, those factors should be considered as well.

Most mainframe manufacturers offer software designed to test the performance of the operating system and applications programs. IBM's Fay, for example, noted that IBM offers the Resource Management Facility (RMF) for large MVS-based systems and that many third-party software vendors offer similar packages.

'The biggest roadblock facing performance evaluators is the fact that no two DP shops are exactly alike. A benchmark that works well for one shop may be inadequate for another.'

While it may not be a consolation for the DPer in search of a benchmark, both Fedsim's Wyrick and Mitre's Bolder agree government agencies looking to evaluate systems have a much harder time than their counterparts in the commercial sector. It often takes years to request bids, select and gain approval to buy a system. And while commercial users have the option of upgrading their systems if they find they underestimated their power requirements, government agencies often have to begin again from scratch, which can take several more years. ■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Benchmarks Available in Six Basic Varieties

There are six basic types of benchmarks that can be used to evaluate processor performance, according to IBM benchmark specialist Bill Fay. He noted, however, that not every benchmarking method is appropriate for every application.

A full-function benchmark is the most accurate and reliable way to evaluate system performance, Fay said. That type of benchmark consists of a representative work load that also evaluates remote terminal emulation to host applications.

The full-function benchmark can be used in batch/interactive, data base or online applicatons.

Another way to measure performance is to focus on an application that consumes most of a processor's resources. This "dominant job" method, while successful for some applications, often makes it difficult to project system growth accurately, Fay said.

Users can also use benchmarks to look at parts of their systems. A batch stream, for example, can evaluate a critical application or segment of the system, Fay said.

Synthetic jobs, or models of jobs, can simulate both existing and potential applications. Fay noted, however, that the job models require close scrutiny to ensure they test the system adequately.

Kernels, or segments, of a work load can be used to measure the CPU-intensive or I/O-intensive segments of the system.

Millions of instructions per second (Mips) ratings can be used to measure processor performance. Mips are generally used as a measure of raw processor power. ■

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Other Ways To Measure

Benchmarks are not the only game in town for users who want to come up with some measure of processor performance.

One option that some researchers say can be as efficient as a benchmark is a model that tests how a processor will react to simulated conditions. However, Bob Bolder, a researcher in Mitre Corp.'s Information Systems Department, noted that the more complex the model, the more accurate it usually is.

Like benchmarks, models usually require some degree of sophistication to develop. They can also be costly and time-consuming. Bolder cited the example of one federal agency that has been trying to develop an accurate model for five years.

There is another alternative to benchmarks: Users can develop a "subjective" evaluation of processors by looking at information supplied by the vendor. Proposals submitted by computer vendors hoping to woo new customers can prove telling, according to Mitre's Susan King, who recently completed a report on benchmarking alternatives commissioned by the National Bureau of Standards.

The experiences of other users can also be helpful in rating processor performance. While benchmarking proponents point out that each shop is different, King observed that how well a processor ran for other users can help the DP manager.

Rating charts, such as Computerworld's annual Hardware Roundup, and similar charts from other trade publications and from consultants can also be helpful, King said. Benchmarking proponents say such charts are unreliable if used as a major part of a decision-making process. ■

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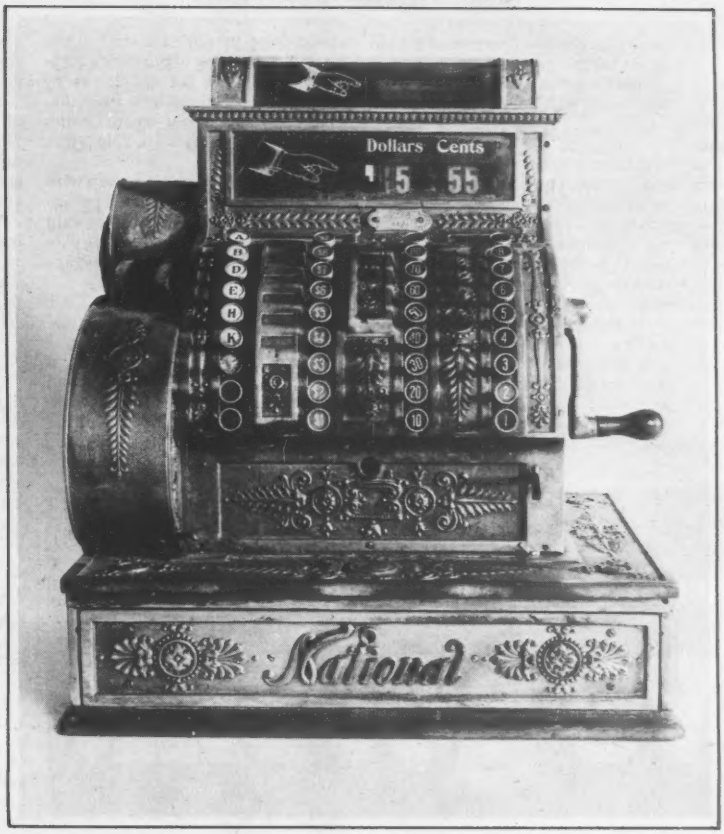

Computer Economics in '83

Lease, Rent or Buy?

By Marguerite Zientara

Should you buy, rent or lease computer equipment in 1983?

The answer depends on your company's cash position, the likelihood of technological obsolescence and the amount of flexibility you want.

Mark Levin, a principal with Peat, Marwick, Mitchell & Co. in Boston, believes that the decision to buy, rent or lease is "definitely not a DP decision." It lies instead with a company's financial officers.

Once the DP department has made its decisions on DP issues — ascertained the size of an upgrade, for example, the number of processors, the potential migration path, the effects of system disruption — then it is up to the chief financial officer or his representatives to decide how to pay for the desired changes, Levin said.

With all your data in hand, show the financial people "what it would cost to buy, what it would cost to lease on a three-year basis, and what it would cost to lease on a five-year basis," Levin said.

By telling the finance department all the terms and conditions involved, the DP department can present various scenarios. According to Levin, DP can tell finance: "If we were to lease on a five-year basis and then wanted to go ahead and upgrade sooner than we anticipate, here's what we'd have to do in order to do all that.

"Once it's all laid out, it's really a matter of the company's financial people sitting down and figuring out which is the best financial alternative, given their cash position and given the tax implications of all the alternatives," Levin observed.

But Edward Cherney, the board chairman of the Computer Dealers & Lessors Association, said, "The predominant method used today is leasing."

Cherney, who is also president of CMI Corp., a used equipment dealership in Troy, Mich., explained that "Whether a company makes Dixie cups or bubble gum, it would rather use its own capital for those capital assets that are making Dixie cups or bubble gum instead of for their computer equipment."

"Deciding to purchase means that you kind of lock yourself into the technology," pointed out Thomas R. Mylott III, an attorney with the Dallas law firm of Peter S. Vogel P.C. "But that's not necessarily bad."

It simply depends on the user's needs. "If you buy a car to go back and forth to work, you don't really care if somebody comes out with a nicer car two or three years later, as long as yours still gets you back and forth to work," he noted. "So if the user buys the hardware to do a specific job and it still does the job, it's proba-

(Continued on Page 40)

Marguerite Zientara is a Computerworld *writer/analyst.*

(Continued from Page 39)

bly no big deal."

But, Mylott observed, "The technology has been changing so quickly that the changes in performance-to-price ratios are not behaving in a predictable way. It could be that you bought a computer that pretty much did the job, and you paid $50,000 to $100,000 for it. Then the next year the PC [Personal Computer] came out and you saw that for $3,000 you could do the same thing you had paid all that money for ... If you want to switch to the IBM [Personal Computer], you've got a piece of hardware that may not be worth much on the used hardware market."

If, however, the user rents the $100,000 machine, he may be able to pay a cancellation charge and get out of his contract — still an expensive proposition, but not nearly as expensive as a $100,000 purchase price tag.

Unload at Loss

Given investment tax credits and accelerated depreciation, "It may still be advantageous to buy something if you're willing to recognize that at some point in time you'll have to unload it, probably at a loss, compared with its value on your books," Levin observed.

At the other extreme, the cost of renting is prohibitively high, Levin said, "because whoever you're renting from doesn't want to bite the bullet for technical obsolescence."

"Basically, it's a question of being able to keep up with the state of the art without having to bury the equipment yourself at the end if you've bought it," explained Susan Nycum, a partner with the law firm of Gaston Snow & Ely Bartlett in Palo Alto, Calif.

"People may want to keep up with state of the art because their application requires it or because they want to keep good people, and good people won't stay around with last year's model," she noted.

Mature Application

On the other hand, some people want stability in a mature application where the machine will just "grind out the work rather than to impress anyone or to get a tremendous amount of throughput, which is possible on some of the newer, faster machines," she added.

In addition, there is the question of unloading the occasional lemon. "If you're leasing from a vendor, you typically have the risk of that machine being a lemon on him, not on you," Nycum pointed out.

"And if you're buying it, after the warranty period is expired, that risk of it being a lemon is on you," she added. "If you are leasing from a third-party organization, you typically have to pay them regardless of whether the machine is a lemon," Nycum said.

"Then you're supposed to somehow chase down the vendor and do battle with him," she noted, "but it's not as satisfactory as if you're in the position of saying to the vendor, who is the manufacturer and the lessor, 'I'm not going to pay the rent until you get this fixed or put one in that works.' "

Cash Position

The decision of whether to buy, rent or lease computer equipment "really comes down to a company's cash position," Levin reiterated. "If you're sitting around with money in the bank that's earning 11% to 12% and you're faced with leasing something that will cost you 16% to 17% on the lease, then you're probably better off making the purchase, because you're not getting as much money on the cash you're holding."

One of Peat, Marwick's clients, who was getting into DP for the first time, had $250,000 to spend and a choice of buying, renting or leasing. "We went out and got competitive prices from third-party lessors — what they would charge us to purchase and then we'd lease back — and then had to determine the firm's cash position," Levin recounted.

The user's money "was sitting in accounts earning interest anywhere from 8% to 17%," he continued.

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"They compared the value their cash was earning against what it would cost them to lease as a percentage basis."

All factors were evaluated against the expected life of the equipment in the client's environment. "We concluded that that machine would be viable — with a couple of minor upgrades, some additional disk and maybe a tad more memory — probably for four years," Levin said. "So we made all our evaluations based on a four-year scenario.

"Economically, it made an awful lot of sense to go ahead and close out one of the low-yield accounts — they had several that were about to hit maturity — and take that money and purchase the equipment," Levin explained. "Today's interest rates are such that a lease would cost, say, 13%, and the best we could do with the money was 11%. So we saved 2% by buying."

But what if that client hadn't had a quarter of a million dollars sitting around? "The answer is obvious — they would have had to turn around and lease," he said. "Then they would have had to determine the impact of lease payments on their cash flow, and that's one of the things that sometimes determines what your leasing period will be."

Other Considerations

When a user does decide to lease, there are considerations other than financial, Cherney pointed out. "Unfortunately, there are many, many people in this business who indicate they can get a transaction completed, when in reality a large percentage of those transactions never close."

How does one determine a lessor's ability to follow through? "Ask for the company's financial statements, find out how long they've been in business, how many other users they've completed transactions for — the things you would do if you were going to buy a house and had to pick a real estate person," Cherney advised.

"It's hard to believe, but there are a number of people who've never leased before coming into the market who don't even think of that," he added. "They assume if someone has enough charisma and knowledge to talk to them about leasing this $3 million machine, they won't even doubt whether he'll get it done; they assume he can get it done. Wrong."

The contract, too, can be a trouble spot. "The general rule is that everything about the transaction — all aspects of the deal, any promises — should be reflected in a written agreement," Mylott advised. "You'd be surprised, but there are very few contracts that really do that."

In vendor contracts, for example, the promises that a sales representative makes about the performance of a machine must be in the contract to be binding, Mylott said. "Depending on the company, claims can be everything from innocuous to extravagant to perhaps even fraudulent," he noted. "It's not legally binding if it's written in a letter or in a side agreement signed by the sales manager" because "they don't usually have the authority to bind the corporation," Mylott concluded. ■

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Forecast '83

Local-Area Network Standards

The Long Wait

By Bruce Hoard

Doomsayers predicted that local-network users would wither away at their workstations before any standards would ever be agreed upon. For a while, it looked like they might be right.

Now, at last, it appears as though the 100-member Institute of Electrical and Electronics Engineers (IEEE) 802 Local-Area Network Standards Committee has come up with some standards that users can hang their networks on.

The stated goal of the committee is: "to ensure compatibility between equipment made by different manufacturers such that data communications can take place between the devices with a minimum of effort on the part of the equipment users or the builders of a system containing the equipment. To accomplish this, the standard will provide specifications which establish common interfaces and protocols for local-area data communications networks."

The committee is committed to realizing that goal within the framework of the International Standards Organization's (ISO) Open Systems Interconnection model, which is a layered architecture. In order to provide the standard, specifications are primarily required at the lowest two levels of the ISO model, the physical and data link levels.

The committee has been working to establish standards for both baseband and broadband local-area networks, two divergent and fiercely competitive technologies primarily based on coaxial cable but featuring markedly different capabilities. Baseband systems offer one channel and are most commonly used to transmit data at speeds up to 10M bit/sec while broadband networks offer multiple channels and provide video as well as data transmission at speeds up to 20M bit/sec.

Led by Chairman Maris Graube, who is also manager of corporate interface engineering for Tektronix, Inc., the committee finalized revisions to "Draft C" at its October meeting in Boston. The revised draft, known as P 802.3, will next be sent to the 500-member Technical Committee for approval before coming before the IEEE's Computer Society Standards Board and finally the IEEE as a whole. The best guess is that it will take about six months and sources close to the process say it should be smooth sailing.

The draft P 802.3 consists of three major documents covering what Graube refers to as "a small family" of standards. The line-access technologies covered are carrier-sense multiple access with collision detection (CSMA/CD) and the token passing bus. The third document represents the committee's completed work on the data link level protocols.

CSMA/CD is a contention line-access method designed for systems based on a bus architecture. In a bus architecture, the various nodes are all connected to a common bus, or cable, that provides a backbone of the network. Simply stated,

(Continued on Page 44)

Bruce Hoard is Computerworld *senior editor/communications and senior editor/office automation.*

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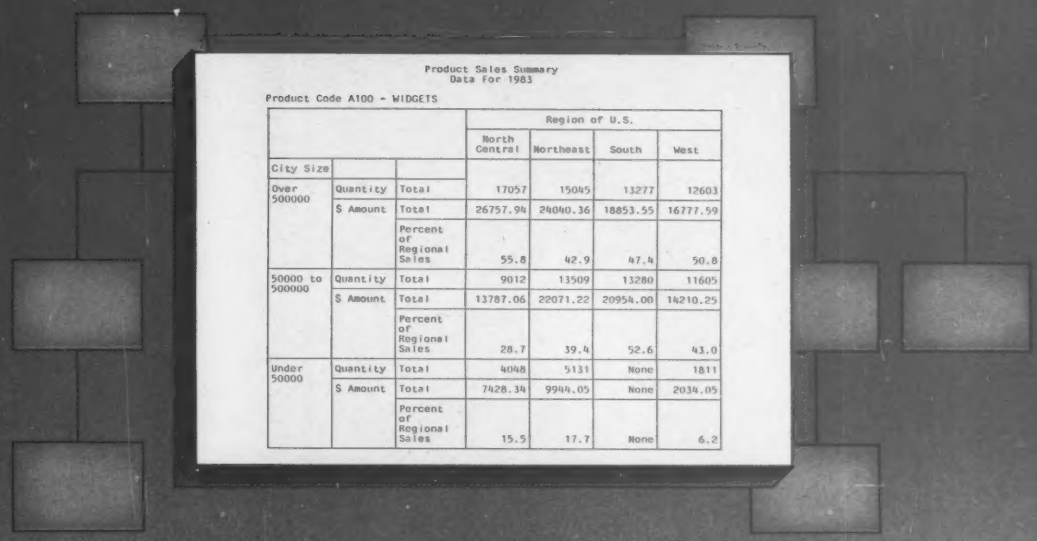

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		Percent of Regional Sales	28.7	39.4	52.6	43.0
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(Continued from Page 42)

the CSMA/CD technique "listens" to determine if another station is transmitting before it attempts to send. If there is traffic, it waits, if not, it transmits.

CSMA/CD has become well known because of its association with Xerox Corp.'s Ethernet baseband local-area network.

The prospects of the CSMA/CD part of P 802.3 are looking decidedly more positive since 13 companies issued a ringing endorsement for it on December 6.

Saying that it "represents convergence of the IEEE 802 working draft, Ethernet specifications and the [European Computer Manufacturers Association] Ecma document," the release is signed by Bridge Communications; Data General Corp.; Digital Equipment Corp.; Fujitsu America Corp.; Hewlett-Packard Co.; Interlan, Inc.; National Semiconductor Corp.; Siemens A.G., Tektronix, Inc.; 3Com Corp.; Ungermann Bass, Inc.; and Xerox Corp.

The endorsement is significant because the 13 companies represent the major Ethernet-compatible manufacturers and HP has announced its intention to offer a local-area network based on Ethernet. Intel's support is important because, along with Xerox and DEC, it collaborated on the original "Blue Book" Ethernet specifications and is now offering a set of very large-scale integration semiconductor chips that act as Ethernet controllers.

Token passing is also a contention method based on a bus architecture. The technique passes a "token" of data from station to station that conveys the right to transmit. After receiving the token, the station has a certain period of time to initiate its own transmission before passing the token to the next node.

Work on a third line-access scheme, known as the Token Ring, is expected to be completed next spring. This method was thrust into the limelight when representatives from IBM layed out its parameters at an 802 meeting last spring.

As it stands now, P 802.3 addresses itself more to baseband than broadband technology. Although CSMA/CD is currently used with broadband networks, 802 has not yet produced specifications to that effect. And the token ring technique is deigned solely for baseband networks. Only the token

(Continued on Page 46)

Peddling A Patent

One of the more interesting sideshows associated with the 802 project might have been appropriately christened "Big Olof and The Holding Company Hustle."

One day last summer, the local-area network world learned that the Dutch-owned Willemijn Holding Co. was the patent holder of a token-passing scheme similar to the one being worked on by 802. Willemijn and its vice-chairman, Olof Soderblom, who developed and patented the scheme, were attempting to peddle the rights to it for a healthy $100,000 down and $45 for each additional node attached to the network.

When potential buyers failed to materialize with checkbooks in tow, the free-enterprise-minded Swede dropped his request to a slightly more modest $25,000 down and $45 per additional node. No one had bitten. Except one. A very big one. The brobdingagian leader of the pack, IBM.

Word leaked out that IBM had paid Willemijn a cool $5 million for the nonassignable rights to the patent. IBM confirmed the transaction. The firm had decided in 1980 that it would license the patent for its 8100 local loop.

The holding company has since withdrawn the patent in order to "refile it with broader claims," Maris Graube, chairman of the 802 Committee said, and work on token passing goes on apace within 802. "Whether the patent is valid or not will be settled in the courts," Graube commented. ■

Brouhaha Brewing Between Data, Video Carriers

A brouhaha may be brewing over the future compatibility of data-oriented broadband local-area networks and the video-based cable television (CATV) networks now serving large metropolitan areas throughout the U.S.

The Institute of Electrical and Electronics Engineers (IEEE) 802 Local-Area Network Standards Committee "is operating from a predominantly data orientation and in terms of installed cable and resources, the world of broadband is dominated by the video industry," Charlie Bass, co-founder and vice-president of Ungermann-Bass, Inc., said in a recent interview. "I think there is the potential of the video industry and the data carriers being in conflict of [the 802 committee's] view of these standards."

The video industry, represented primarily by the National Cable Television Association (NCTA), has not yet formulated a position on this problem, Bass added. But when it does, it will look at data integration into CATV networks from a "completely different" perspective than do data carriers, "and those folks have enormous influence in the technology."

Meanwhile, data carriers are developing standards and coming up with their own technology, techniques and frequency allocation schemes, Bass noted. These carriers have left "a fairly small" part of the bandwidth for video and are not as sensitive to the quality of video signals as the video carriers are, he explained.

Jerry McDowell, product manager for networking communications at Wang Laboratories, Inc. claimed it is too early to tell what will transpire between data and video carriers. "By making a comment on that, it would only be generating controversy before things really get off the ground.

"That's what happened in the very beginning with 802 and I'd like to avoid it," he added.

McDowell pointed out that the CATV industry is represented on the 802 committee's recently formed Metropolitan Area Network Subcommittee.

Flexible Carriers

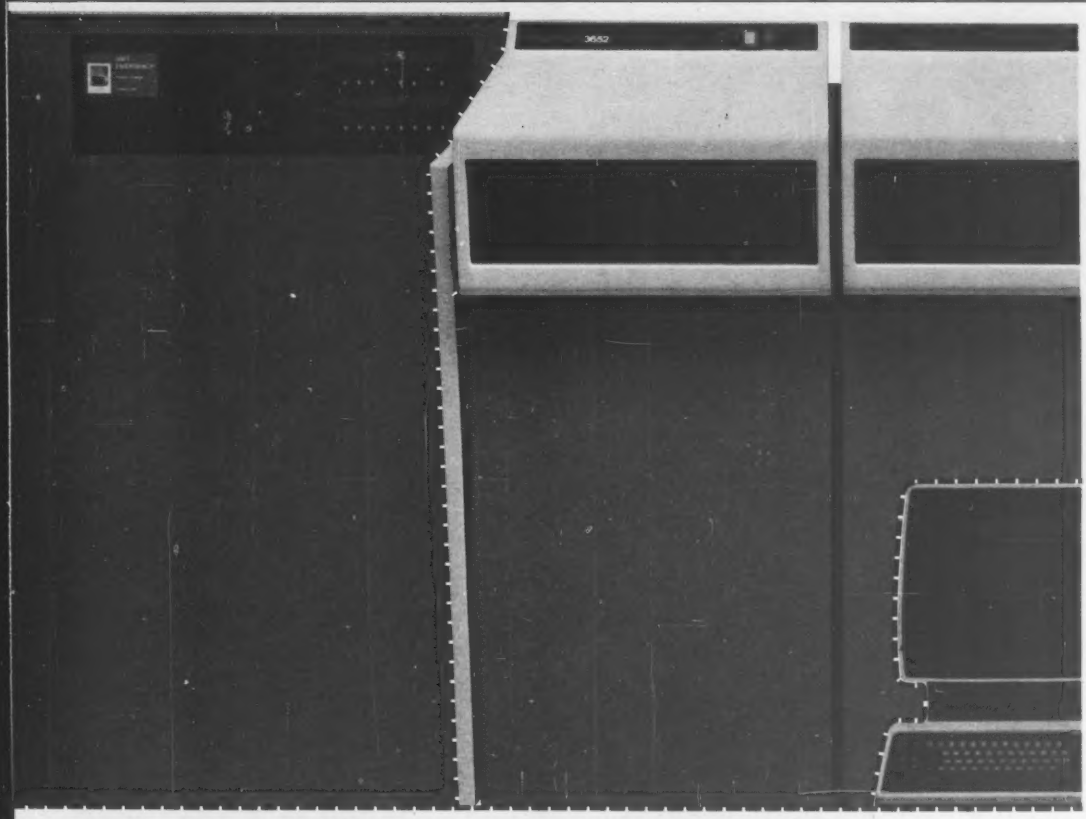
Wendell Bailey, vice-president for science and technology with NCTA, made it clear that data carriers wishing to transmit over CATV networks will have to be flexible. "After all, data is not a business," he noted. "It is not something that anybody goes out and buys . . . It's a service."

And "if people wish to transmit this service on a metropolitan area network, it behooves them to determine the flexibility of the pipe in which they intend to pour it," Bailey said.

There is a lot of room to transmit data over CATV networks and a lot of interest in doing so, Bailey added. He would like to see an IEEE official attend an NCTA Networking and Architecture Subcommittee meeting.

The NCTA official pointed out that data carriers cannot demand that CATV networks be revised to accommodate data transmission any more than video carriers can demand that AT&T readjust its dial-up network to facilitate video.

Will Zachmann, vice-president of technology assessment for International Data Corp. in Framingham, Mass., observed that CATV operators can do well by carrying data. "An operator would have to be out of his right mind to be opposed to carrying data because it's pure gravy revenue when you're talking metropolitan area," he commented. ■



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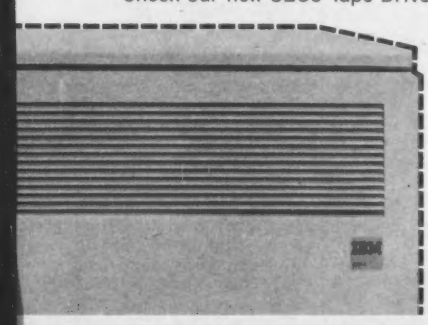

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(Continued from Page 44)
bus approach has been specified for broadband use.

Most of the controversy swirling around the standardization process centered on just how close the standard should adhere to the Blue Book specifications.

Graube said the P 802.3 CSMA/CD standard "borrows a lot from Ethernet but is not quite like Ethernet."

In a recent interview, David Liddle, who was vice-president of Xerox and general manager of its Office Systems division's strategic business unit during most of the standards setting process, played down suggestions that 802 was beset by political polarization over how closely the CSMA/CD standard should resemble Ethernet.

According to Liddle, Xerox was flexible toward proposed changes in the Blue Book specs and actually revised them when it was shown that they would be improved by the alteration. On the other hand, the company refused to change the specs if in its opinion the proposed revisions added nothing to, or failed to improve them. He pointed out that at one point the 802 spec was also changed to comply with the Blue Book.

Liddle, who is now vice-president and co-founder of Metaphor Computer Systems, Inc. along with former Xerox vice-president Donald Massaro, claimed there was no anti-Ethernet block within the committee, said 802's first CSMA/CD draft was "98%" consistent with Ethernet and that differences between the two were "negligible".

What does the 802 committee's agreement on P 802.3 mean to users? We now have a very clear CSMA/CD standard that has U.S. and international support and lets lots of people build low-cost components," he said.

Charlie Bass, co-founder and vice-president of Ungermann-Bass, Inc., an Ethernet-compatible local-area network manufacturer, disagreed vehemently with Liddle's assessment of the political scene within 802.

"Absolutely no question about it," he replied when asked if there was an anti-Ethernet block within the committee. "And, in fact, that would not have been resolved had the 802 committee reorganized itself to isolate that anti-Ethernet sentiment."

The reorganization Bass referred to came last August when the committee spun off working groups for each of the three line-access technologies, CSMA/CD, token bus and token ring. Graube said the change was made because it made sense to have experts from each of them working together when it became clear separate standards were evolving in each of those areas.

According to Bass, before the change, members from the full committee were allowed to scrutinize work done in each of the line-access areas.

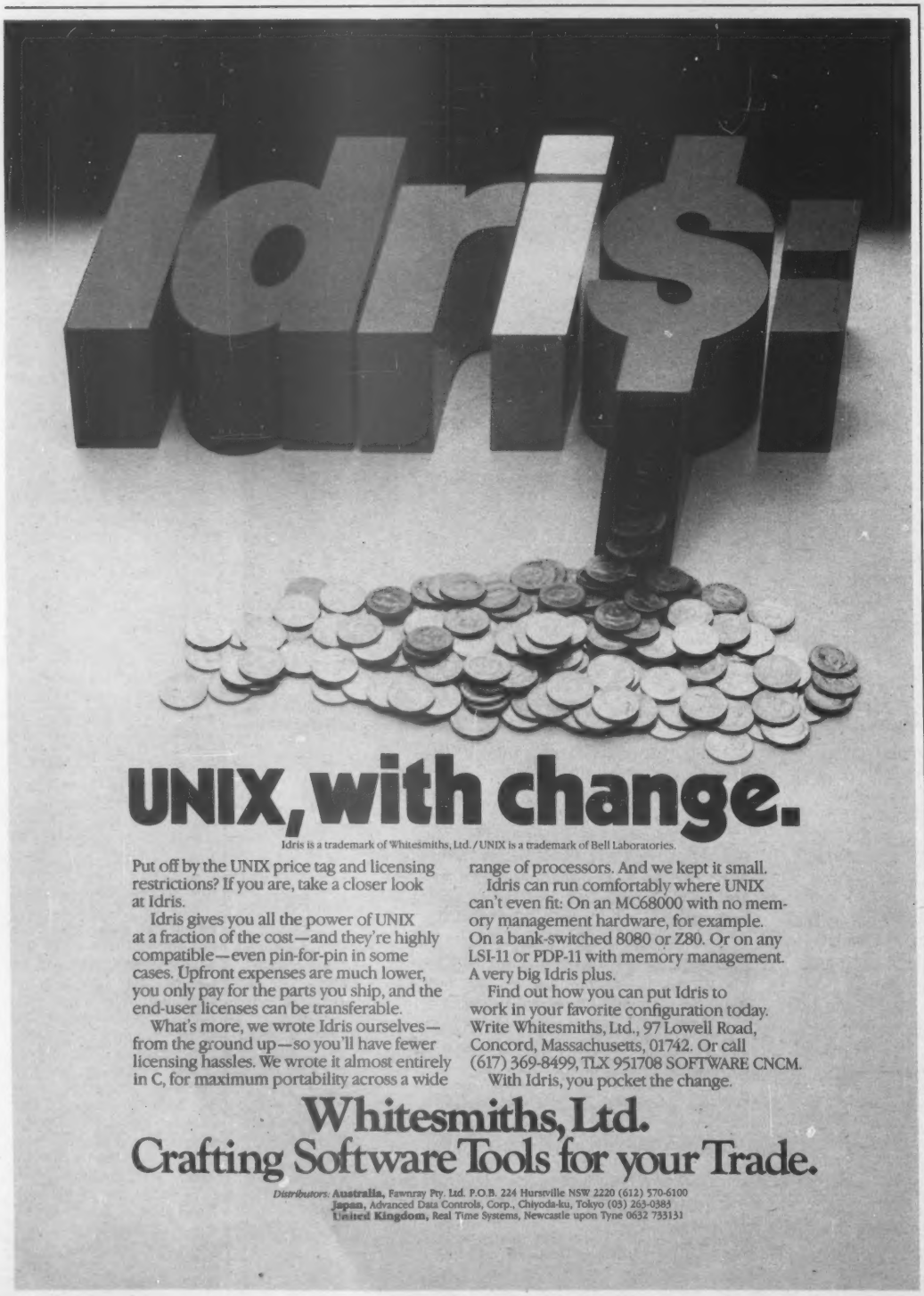
"Within the new CSMA/CD group differences from the Ethernet spec were manageable, while before other technical groups did not want the CSMA/CD technology to be successful," he declared.

The reason some members of the other technical groups did not want CSMA/CD to be successful was they were afraid Ethernet-type manufacturers would outperform them in the marketplace, he added.

Jerry McDonald, product manager for networking communications with Wang Laboratories, Inc. and an 802 member, maintained that more work should have been done on the CSMA/CD standard.

McDonald said there were problems with the frame delimiter, the block that procedes data. According to him, the evolving 802 method of dealing with that was considerably different from Ethernet, but was set aside when Ecma ratified the Ethernet approach.

McDonald, Bass, Liddle and others who followed the work of 802 agreed that the Ecma Ethernet endorsement put tremendous pressure on the committee to pound out a CSMA/CD standard that closely paralleled Ethernet. ■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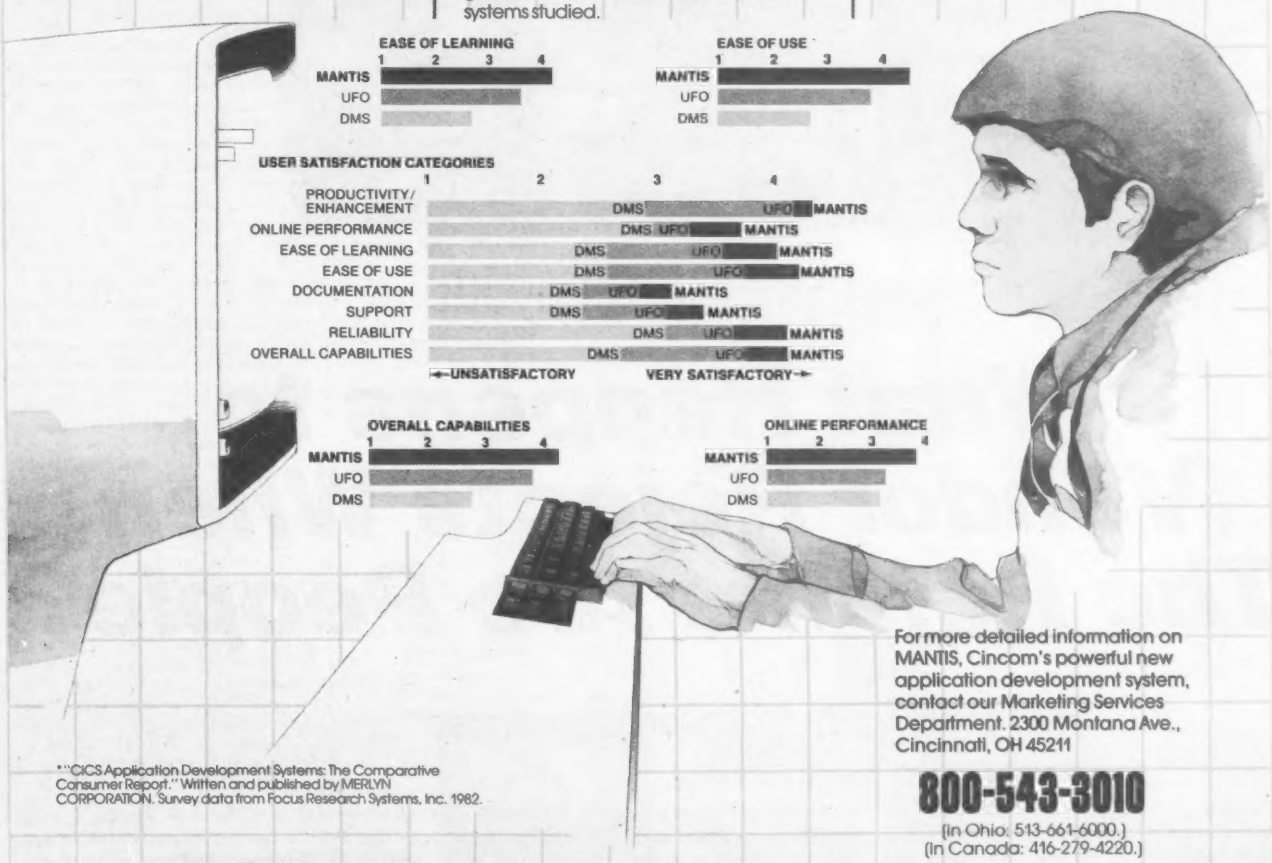

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Last Year's Layoffs

What Happens to Vendor Rejects When The Rejects Are People?

By Marguerite Zientara

Unemployment in the computer industry is up — that everyone knows. But what happens to people after they are laid off from vendor companies? Do they find other jobs immediately? Do they change careers? Do they sit home and drink?

Marguerite Zientara is a Computerworld *writer/analyst.*

There are as many answers to these questions as there are unemployed workers, judging from a random survey of layoff victims, their former employers and DP-oriented placement companies around the country. *Computerworld* contacted three layoff victims: one who was let go last January but found a new and better job two weeks later; one who was laid off last January and is still unemployed; and one who was terminated in October and is still out of work.

The first, a former administrative specialist at Honeywell, Inc. — now employed by another prominent mainframe vendor — was "one of the very, very lucky ones" who "never missed a paycheck" after his January layoff notice came. Although he made use of Honeywell's outplacement services, which were "as good as they could have been," the current manager of marketing ser-

vices recalled, "I had my own resume done before they did."

His new position came "totally through my own efforts," he said, while acknowledging that "the Good Lord was looking over my shoulder for a while. I was hired before any of the others who were laid off at the same time.

"Being in the right place at the right time is as important as being qualified and good at what you do," he observed. The fact that he got good recommendations from the Honeywell people he worked with and for during his two years there also helped.

This layoff victim "couldn't be happier," because "I finally got a job in my field." After an adjustment period necessitated by his move from a large firm to a small company, he has concluded that his new employer firm is "very intelligently run, the products are much more exciting and state of the art and every position is a growth position."

For those still unemployed, he feels the outlook is "obviously bleak — I hate to say it."

More Optimistic

More optimistic, but with a slight erosion of enthusiasm, is Lee Gallant of Needham, Mass., also laid off in Honeywell's January purge and still unemployed. An allocations administrator for 1½ years at Honeywell, Gallant is looking primarily for a job in sales and marketing administration, although he is starting to lower his sights to just sales "as a way to get started with a company." Honeywell's outplacement services were "very helpful in terms of being a good place to look at trade publications and use the phones, but they were not geared to offering individual help," according to Gallant. "It was fairly well done and useful if you took it for what it was."

Relying heavily on personal contacts, "friends of friends," informational interviews and referrals, Gallant has "talked to quite a few companies, but I've run into hiring freezes." In addition, when companies "cut down to the bare bones to survive, they tend to get rid of administrators, people they feel they can do without."

What is Gallant's outlook after 11 months of job searching? "I really don't know," he said. "I have a little more optimism about the economy, which may look up a bit after the first quarter, but that's just a guess.

"I'm trying to be optimistic," he added. "I still believe in myself and believe I can do a good job for a company. I just need more exposure and feel if I can get it, then I will get a job."

Gallant has sent out about 100 resumes, "maybe more." Although his financial state is not critical yet because his wife has "a good job" at Honeywell, he said "if this goes on significantly longer, we'll be in a little bit of a bind."

In general, Gallant feels that "it will still take some time for other laid-off workers to get hired back at similar types of companies that laid them off. When the economy turns around, they will be slow to hire back to their previous levels.

"Maybe the smaller and newer companies will hire more quickly," he postulated.

With an "excellent" prognosis after being unemployed for six weeks, engineer Dale Stearns of Wellesley Hills, Mass., considers it "just a matter of time" before he finds a new job.

Stearns was laid off from his job as electronics project leader at the International Equipment Corp. Division of Damon Corp. in Needham Heights, Mass., after 4½ years. While Damon's outplacement services were "excellent" and are still available to him, Stearns feels this is a "tough time of year" to be looking for a job.

"The combination of funding concerns and the holidays is causing many companies to sit on things instead of making decisions," he observed. Predicting a "tremendous upsurge after the new year" in the Northeast, Stearns recommended that anyone out of work should not "lose heart and should keep pounding — that's the key to the quickest way to success.

"People can't sit back and stop looking," he added. "They're hot to trot the first few days, but then they feel they can't do it and just sit back and depend on agencies.

"You have to pursue all avenues. Use agencies, answer ads you're interested in, make use of contacts you did business with while you worked for a company, go out to places you'd like to investigate," he recommended. "In the past, I've gotten work just walking in blind to places when there was seemingly no work around." ■

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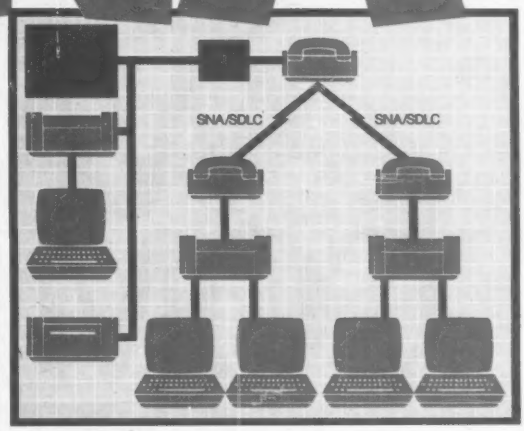

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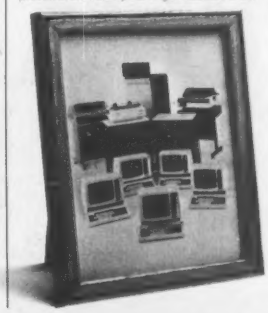

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Computer Industry Layoffs Widespread, Varied

Just how many layoffs have there been in the computer industry this year? U.S. Department of Labor statistics show a jump in electronics unemployment from 7.1% in May to 13.1% in November. A survey of some of the larger computer vendors produced the following laundry list:

• **Burroughs Corp.** at year-end 1982 has 63,000 employees worldwide vs. 67,000 on Jan. 1, 1982. Burroughs' cutbacks were complicated by the firm's acquisition of Memorex Corp. and the subsequent phasing out of duplicate facilities and an overall reorganization of the corporation. Terminations were across-the-board, with the majority being assembly and hourly wage workers.

Total: 4,000.

• **Datapoint Corp.** on March 26 terminated 230 people, both administrative and clerical, in its domestic operations group, stemming from the relocation of the Waco, Texas, plant to Fort Worth, Texas. At the same time, there was some hiring in Fort Worth to fill the gaps caused by employees not willing to relocate. April 7 brought the reduction of the firm's domestic field marketing force by 250 people.

Total: 480.

• **Honeywell, Inc.** laid off 1,150 employees last January — about 700 in the U.S. Marketing and Service Group (USMSG) and 450 in the Small Systems and Terminals Division (SSTD). Two-thirds of the layoffs were in Massachusetts. USMSG cuts were in product planning and marketing support positions. SSTD cuts were in direct manufacturing (250), indirect manufacturing (100) and engineering and planning support (100).

On Dec. 2, another 1,750 workers in the Information Systems Division were cut — 700 in Massachusetts, 450 in Phoenix (125 in production), 115 in Minneapolis, 485 in field support and international operations. In Massachusetts, 280 were in SSTD and the rest in USMSG.

Total: 2,900.

• **National Semiconductor Corp.**, on Aug. 6, laid off 1,000 largely production workers "to bring capacity back in line with demand," a spokesman said.

Total: 1,000.

• **Sperry Univac's** U.S. population is down 4% to 32,500 from 34,000 a year ago. The Santa Clara, Calif., disk-drive plant has been reduced from 1,900 to 1,800 workers; Bristol, Tenn., has dropped from 2,000 to 1,500 workers; and the Irvine, Calif., minicomputer plant was transferred to Salt Lake City, Utah, for a drop from 1,000 to 150 in Irvine. Most cuts were of assembly and hourly wage earners; 1% of the professional work force was laid off.

Total: 1,500.

• **Storage Technology Corp.** laid off 400 nonmanufacturing personnel in November, its first mass layoff since the firm's founding 13 years ago. Categories included engineering, finance and administration. A few workers have been called back already.

Total: 400.

• **Texas Instruments, Inc.** laid off 2,700 people on March 17, 850 on April 30, 300 on May 28 and 2,600 on Sept. 27. No breakdown is available of worker types.

Total: 6,450.

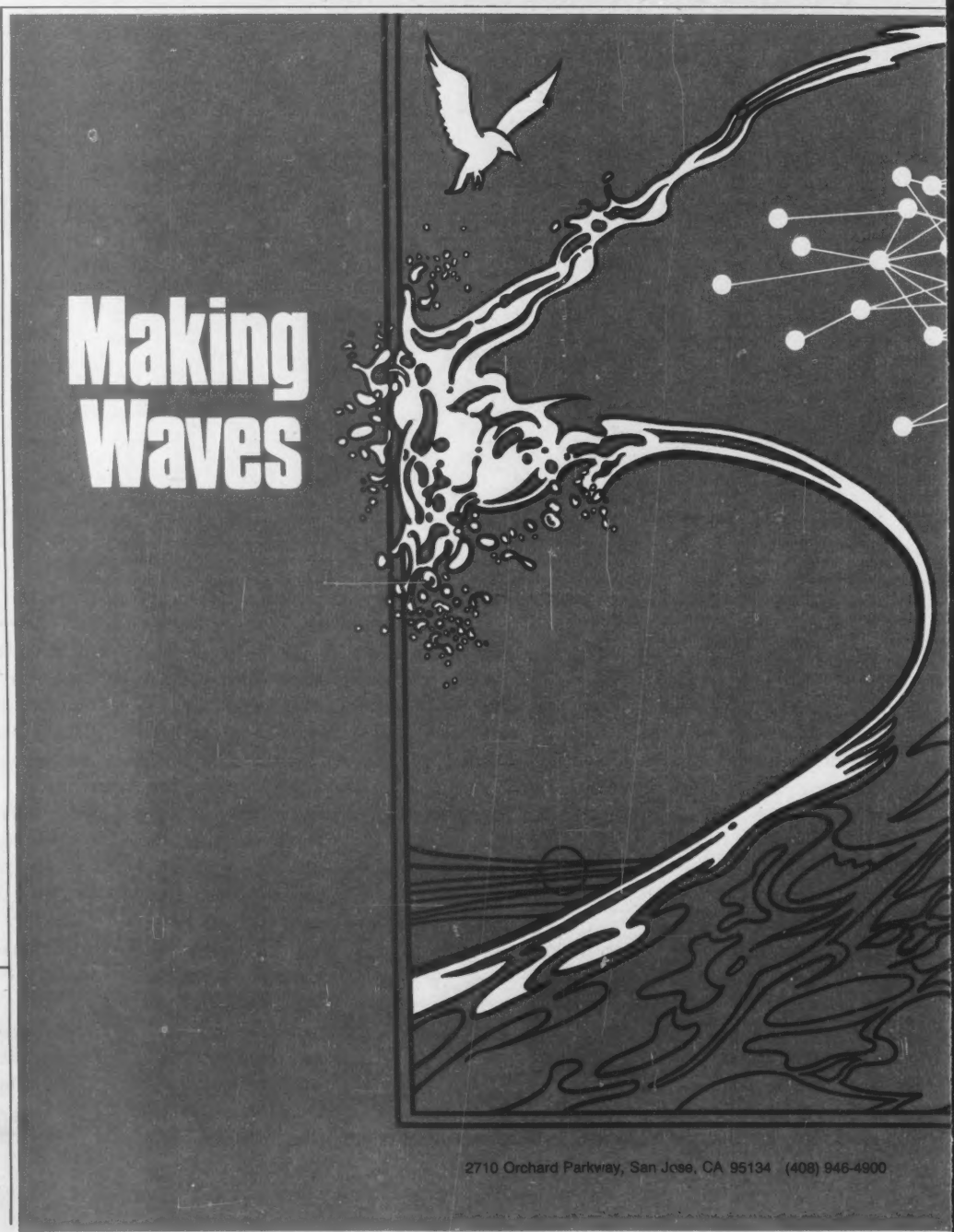
Grand Total in 1982 for Seven Companies: 16,730.

Storage Technology was the only company that indicated it did not offer outplacement services. Most attempted to help those laid off by furnishing resume writing help, the use of typewriters, free long-distance telephone lines, job listings at area companies, interviewing technique counseling, advice in applying for unemployment benefits and, in some cases, informational pamphlets aimed at the job-seeker.

The question now is whether the New Year's expected upturn will result in jobs for those laid off this year. Some have their doubts.

One employment expert even suggested that "a lot of this is contrived.

"Companies are taking advantage of the economic situation to get rid of people they didn't want to hire in the first place," according to Ron Armstrong of Armstrong & Associates in Houston. "It's a good excuse



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to get rid of blacks, females and men and women over 40 — the minorities they had to hire — and not have to answer to the government for it."

"People usually are not laid off without just cause," according to JoAnne Rudolph, account executive with the CompuSearch Agency recruitment firm in San Francisco. "Generally speaking, those laid off are deadwood or incompetent."

That depends on your definition of "deadwood," according to Joe Quirk, office manager at Perry White & Associates, Inc., a DP employment firm in Waltham, Mass. "At one company, 'deadwood' can mean nonproductive, not keeping up with management's criteria, but in another company it can just mean anyone who is not involved in the manufacturing end," he said.

In many cases, "those who are really good are not part of the layoff picture," observed one Boston-based employment counselor, "but if there's no choice at a company, the good go with the bad, in which case the good people will have no trouble finding a suitable position very quickly." ■

DP Job Agencies Getting Positive Vibes

The unemployed are not the only ones who see an upswing in hiring after the first of the new year. DP-oriented personnel agencies around the country are getting the word from client companies that new hires are coming soon.

The outlook for 1983 is "Fantastic. We definitely have high hopes in terms of employment," remarked Joe Quirk, office manager at Perry White & Associates, Inc. in Waltham, Mass.

–"We bottomed out 2½ months ago" in terms of job listings, Quirk said. "Since then there has been a gradual increase in the number of positions at high-tech firms, and we see it getting better."

People being laid off now from high-tech firms "will definitely be absorbed before next year's new graduates find positions," Quirk forecast, noting that "the fresh graduates have the hardest time finding positions."

There will be more hiring in the San Francisco area as well, according to JoAnne Rudolph, account executive with Compusearch Agency, a recruitment firm. "That's what my employers tell me."

While agreeing that the new year is expected to bring a turnaround in the employment picture, Ron Armstrong of Armstrong & Associates in Houston tempered his enthusiasm: "I really don't think it will ever get back to the frantic running around there used to be."

Meanwhile, despite the predicted upturn, some placement firms in Boston, Houston, Dallas, San Francisco and undoubtedly elsewhere are themselves bottoming out — cutting back personnel or going out of business completely. The job orders to keep them going just do not exist.

In Dallas, about 150 smaller employment shops (with two to six counselors) have closed since the beginning of the year, according to an unemployed project manager who calls it "the worst conditions here in seven years." In the San Francisco Bay Area, a number of DP placement shops are cutting or closing, according to Rudolph. The local branch of Perry White has shrunk from 25 counselors last year to six this year.

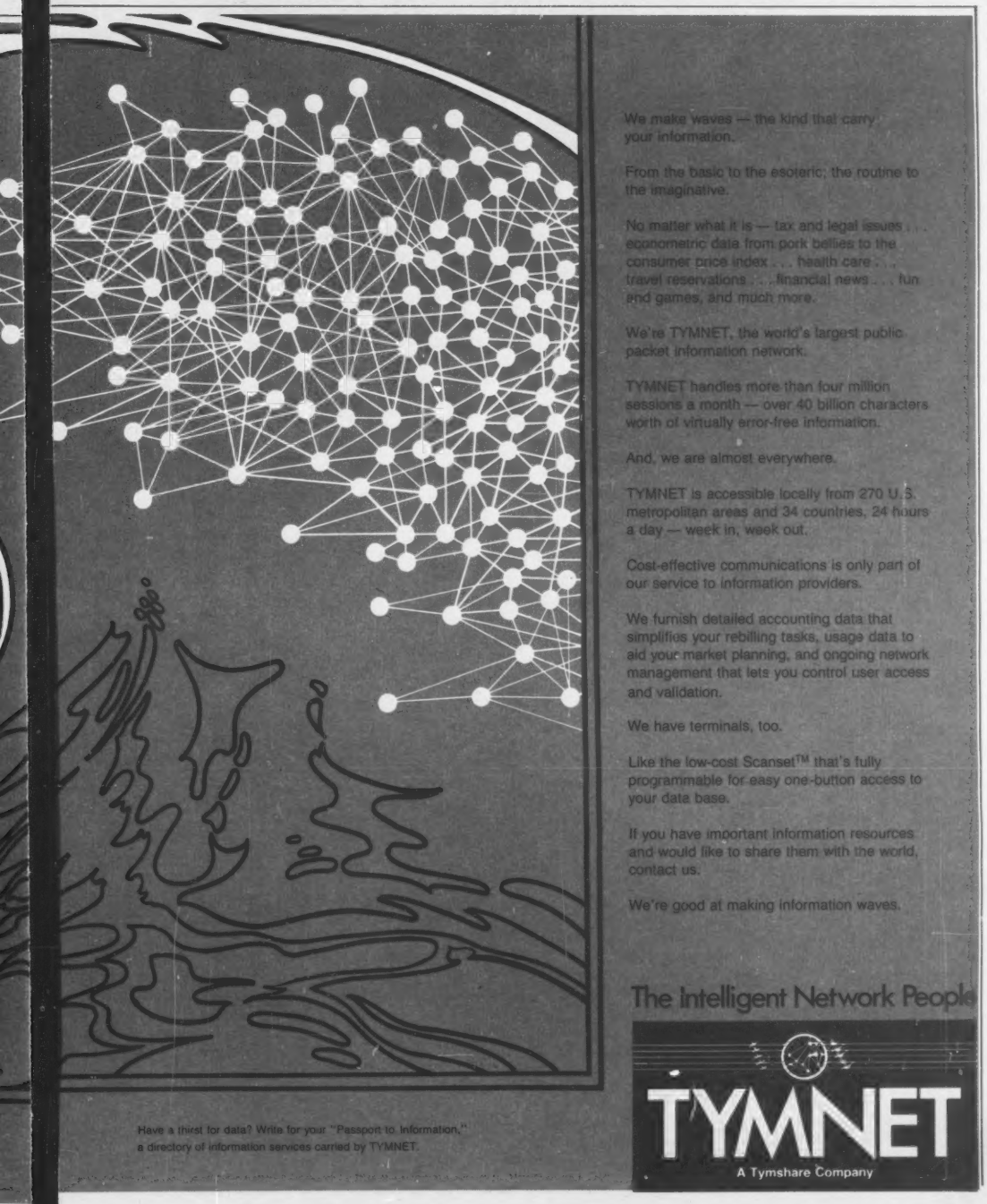
"It's a sheer miracle I'm still going," said Armstrong in Houston, "and I'm going only because I've diversified into other things."

Armstrong pointed out that "what used to be the biggest DP employment agency in the Houston area having up to 17 counselors is now down to the owner and two counselors." That firm has 25 real job orders vs. 500 to 1,000 last year, he said.

"Fifteen minutes ago, I spoke with an agency owner who has exactly one job order," he added.

With about 2,500 job applicants in his own files, Armstrong presently is working with two DP job orders. The jobs are for "heavy technical support types," he said, adding that systems analysts can "forget it."

Prospective employers can afford to be very discriminating when hiring, Armstrong observed. "It's worse now than it was back in 1970," he said. Job seekers "can't even get an interview now ... There's been a complete turnaround from the days when you could get a job with 60% of the qualifications sought." ■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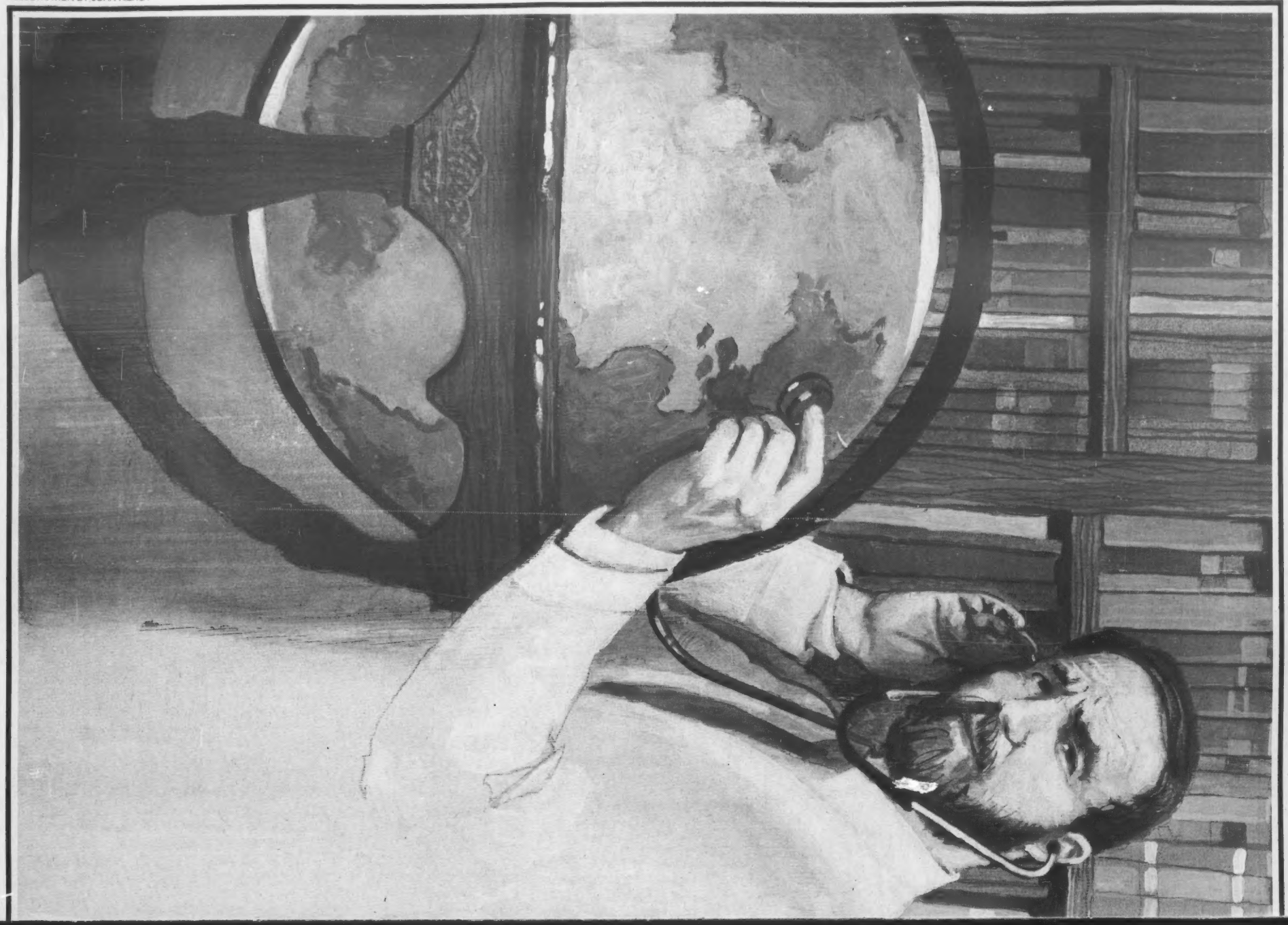


Forecast '83

The Worldwide Computer Market

Is Recovery On the Way?

By Bill Laberis

The cover of *Business Week* last May 10 was bright red. It featured both the smiling face of Ronald Reagan and a headline trumpeting, "Here Comes the Recovery."

Seven months later, the U.S. — and indeed the world — is still waiting for that recovery. Economic prognosticators have adjusted their rose-colored glasses and now find themselves staring at a coming year filled at best with uncertainty and anemic recovery.

Capital spending, the grist of economic growth, was flat this year and is widely expected to plummet in 1983. Consumer confidence, without which a recovery cannot happen, grows dimmer with each new report of rising unemployment, both here and abroad. These are the days that give new meaning to the definition of economics as "the dismal science."

To date, the computer industry has weathered the recession perhaps better than any other discrete sector of the world economy. Only the semiconductor manufacturers, which have laid off thousands of workers, have felt the across-the-board impact of the prolonged economic slide that has ravaged the steel and auto industries.

But cracks in computer industry performance began to show in 1982. If IBM's profit and revenue performance is omitted, the computer industry as a whole displayed the strain of the recession. In the first nine months of 1982, Amdahl Corp.'s profits were down 81%; Control Data Corp.'s, 32%; Sperry Univac's, 72%; and Data General Corp.'s, 51%.

And if the shipment gains of IBM's 3080 line of mainframes are omitted from the overall scorecard, growth in the general-purpose computer market was relatively flat this past year. Only IBM and the makers of personal computers emerged as recession-resistant operators.

Although worldwide real economic growth on the order of about 2% is predicted for 1983 — less than half the growth of a healthy recovery period — much of that growth is expected to come in the areas of housing construction and stepped-up defense spending both here and abroad. It is questionable whether this kind of increased spending will do much to affect gains in sales of computer equipment, many observers feel.

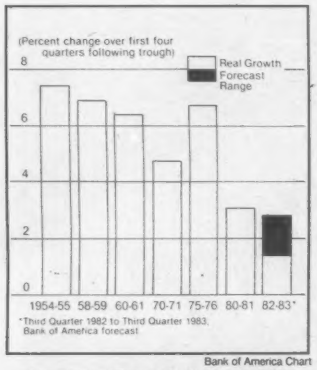
"Information processing and office automation are cost-saving necessities, which is why these areas have grown during most of the recession," commented economist Otto Eckstein of Data Resources, Inc.

More Trouble Ahead?

Efficiency and productivity drives will continue to buoy the industry in 1983, Eckstein predicted, but a downturn in overall capital spending could wreak further havoc on industry profits.

(Continued on Page 57)

Bill Laberis is Computerworld *senior editor/computer industry.*



Bank of America Chart

Average Growth in Real GNP During Recovery Periods

U.S. Computer Mart Growth Forecast

Meaningful recovery from the worldwide recession will occur only if there is a prolonged recovery in the U.S., according to analysts recently interviewed. And domestic recovery will result from a burst of consumer confidence, government-induced lower interest rates and a surge in capital spending.

This quick-fix potion must be somehow blended despite "the most grotesque economic policy we've seen in decades," said Harvard University economist Otto Eckstein, referring to President Ronald Reagan's economic recovery plan.

"We are the center of the world economy, no doubt about it," Eckstein said. "Our policies, for better or worse, call the tune for the whole world."

Worldwide economic uncertainty notwithstanding, a continued demand in 1983 for more computing horsepower, the proliferation of microprocessor-based small systems and new products will ensure continued growth for the U.S. computer industry, although price competition in a market characterized by limited demand will squeeze profits once again, analysts feel.

According to International Data Corp. (IDC), strong shipments of IBM 30 series processors gave IBM a solid financial performance in 1982, compared with its competitors. Other mainframers — Amdahl Corp., for example — have experienced difficulties in part because they have yet to begin shipping new high-end machines. But even if 1983 proves to be a sluggish recovery period, this situation should change for the plug-compatible manufacturers (PCM).

"IBM is in the happy moment of its product cycle this year," Eckstein said. "The PCMs should catch up in 1983, depending, of course, on what happens in the economy."

With few exceptions (Honeywell, Inc. being the most notable), the industry in 1982 managed to sidestep the wholesale layoffs that wracked other segments of the economy. Instead, the computer industry fought the recession with a combination of work force reductions caused by attrition, hiring freezes, wage freezes and some wage cuts. Analysts interviewed said that even a modest recovery would allow domestic manufacturers to maintain current work forces throughout 1983 without jeopardizing the research and development efforts needed to produce a new electronic cash crop.

Traditional Bellwether

But a traditional bellwether for the computer industry, the U.S. semiconductor industry, is in much tougher shape, operating at roughly 75% of capacity, according to the Semiconductor Industry Association (SIA). Texas Instruments, Inc. alone has laid off more than 12,000 workers during the recession.

Nevertheless, SIA is predicting growth of 18% in 1983. IDC has noted that full recovery in the semiconductor segment of the industry will not occur until computer shipments pick up, as computer companies are the largest users of semiconductors.

Certainly one of the biggest unknowns in 1983 will be the course the federal government will chart to bring some stability to what has been a deteriorating situation. Cries for protection of U.S. industries against foreign competition, the Japanese in particular, have become louder as unemployment has soared into double-digit figures.

"We need some drastic moves on this front, but we'll probably make the wrong moves, protecting steel and autos and textiles," Eckstein said. "We should protect our strengths," he said, alluding to the information processing industry, "not our weaknesses."

"The best thing the [U.S.] government can do for industry next year is bring down interest rates so cost of capital is in line with what it is in Japan," remarked Larry Chimerine, chairman of Chase Econometrics. Chimerine also said the government should work "to bring down the value of the U.S. dollar on foreign exchange markets," which would fatten the profit statements of U.S. computer firms selling abroad. ■

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Japan Watching IBM's Moves

"To understand what the Japanese computer manufacturers propose doing in the marketplace, one must recognize that the Japanese are mesmerized by IBM — what it stands for, does or is likely to do," wrote computer market analyst Ulric Weil in his recently published *Information Systems in the '80s.*

In 1983, this will mean matching IBM dollar for dollar, product for product, Weil observed in a recent interview.

"Japan, Inc. is railing against America Corp., which the Japanese see clearly as IBM," another analyst remarked. "Recession or not, they'll be every bit as aggressive in 1983 as they've been in the past. In fact, with a general slowing of world demand, they're apt to become even more feisty."

Indeed, the Japanese industrial juggernaut is slowing, its economic fabric showing distinct signs of wear. Although the Japanese economy remains the premier performer among all industrial nations, "Japan's luck is beginning to run out because they can no longer export their troubles due to the downturn in world trade," a third analyst observed.

Japan watchers are looking for real growth of between 2.5% and 3.5% in 1983, a far cry from the boom times of recent years when uninflated growth of 5% and more was the rule.

Mounting World Pressure

Equally important as Japan's posture in the face of the recession will be the way the country reacts to mounting world pressure to tear down the allegedly protectionist barriers that have helped its industries flourish over the past two decades. The Japanese exist within a closed society, economist Otto Eckstein said, and will do little to tear down protectionist barriers in 1983.

But the pressure to do so is intensifying. In a recent report, the White House U.S. Trade Representative Office blasted the Japanese government for failing to act expeditiously in removing high-technology trade barriers.

Even if Japan does tear down a portion of its alleged trade barriers in 1983, which some believe is happening in nongovernment sectors, "there is some question whether the Japanese people will be willing to buy from another country," Weil speculated.

Meanwhile, analysts predict Japanese computer companies will continue to forge alliances, trading partnerships and other joint ventures with American firms, using the leverage provided by readily available equity capital to exploit homegrown talent and innovation. All the major Japanese mainframe vendors have interests in U.S. firms manufacturing IBM plug-compatible mainframes — Fujitsu Ltd. in Amdahl Corp., Hitachi Ltd. in National Advanced Systems, Inc. and Mitsubishi Industries in IPL Systems, Inc. ■

(Continued from Page 55)

Commenting on the effects of overall industrial sluggishness on the computer industry, Eckstein said, "I wouldn't want to be a computer salesman in Detroit in 1983." Also, he sees no evidence that the recession has bottomed out.

According to Eckstein's analysis, the root of current economic problems is that the world economy is shrinking. The volume of world trade in 1983 could be down as much as $150 billion compared with three years ago, causing "severe structural unemployment, financial distortions of alarming magnitude and strained business relationships," according to *Moody's Bond Survey.*

As of this writing, more than 30 million workers in Western industrialized countries are unemployed, their numbers inexorably increasing.

	History			Forecast	
	1980	1981	1982	1983	1984
Canada*	0.1	3.1	-4.9	2.5	3.9
France**	1.1	0.6	1.6	1.0	2.0
Italy**	3.9	-0.2	0.6	1.4	4.5
Japan*	4.2	3.0	2.7	3.4	4.2
United Kingdom**	-1.6	-2.0	0.9	2.1	2.8
West Germany**	2.0	-0.1	-0.6	0.6	3.0
United States*	-0.4	1.9	-1.7	2.2	4.4

*Gross National Product.
**Gross Domestic Product.

Source: Data Resources, Inc.

Annual Rates (Percentages) of Real Economic Growth

One effect of the deteriorated world trade situation, and the fact

(Continued on Page 58)

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Is Recovery on the Way?

(Continued from Page 57)

that the U.S. is relatively better off than many of its economic allies, has been a particularly strong U.S. dollar on world markets — artificially strong, some analysts say. For U.S. computer companies, some of which do 40% or more of their business abroad, the result has been devastating. Because the U.S. economy may well perform better than those of its trading partners in 1983, computer manufacturers may be staring at a continuation of that situation.

Morgan Stanley computer industry analyst Ulric Weil is looking for "a somewhat delayed recovery in 1983 and slower growth thereafter." He added, "We've scaled down our hopes for the vigor of the recovery."

Like Eckstein, Weil said that capital spending "shows no signs of coming to life," claiming this situation is "intimately linked to the computer industry, where capital spending is a key variable." Weil predicted that the downturn in capital spending could be particularly debilitating to the minicomputer manufacturers specializing in industrial, scientific and computer-aided design/manufacturing applications.

While the major vendors "have the financial stamina to withstand another flat year," Weil said "they may not like the financial results in 1983."

OEM inventories, like those of the entire manufacturing sector, are at "the lowest tolerable levels," Weil added. The need to replenish these inventories, along with an upturn in consumer confidence, will spearhead a modest U.S. recovery, which he said will spread "painfully slowly" to Europe and the rest of the world.

By most measures, 1982 was the single worst year for the world economy since the Great Depression. Next year will be better, but only slightly. As one analyst put it, "If the recovery is sustained at all in 1983, it will do so only with a lot of luck." ■

'Mixed Bag' Expected in Europe

A mixed bag of recovery, recession and stagnation is expected next year in Europe, with growth generally lagging behind Japan and the U.S.

For European computer companies, this situation could produce the same market flatness that plagued many of them in 1982. Anticipating such market conditions on the continent, Britain's International Computers Ltd. (ICL) will vigorously target the U.S. market in 1983 and beyond, company officials have indicated. ICL's Model 21 Retail Controller will spearhead the company's renewed drive on the U.S. market, according to International Data Corp.'s "Europa Report."

ICL saw its profit picture move into the black in fiscal 1982: It earned nearly $26 million after losing $90 million in 1981. The turnaround followed two years of aggressive cost cutting and plant closings. In 1983, the company is likely to begin forging joint deals and collaborative agreements with U.S. and Japanese companies.

Analysts and economists believe that 1983 will be a relatively good year for both Britain and Italy, which have been hammered by recessionary blows in the past several years. While observers concede that the 1% to 2% real growth likely in those countries is hardly earth-shattering, it would indicate that the recession has indeed bottomed out in those two nations, both of which are currently plagued with excess industrial capacity.

In France, on the other hand, the recession may be just picking up steam, economists say. If this is the case, 1983 may well see a slowing in the French government's effort to expand videotext and teletext services.

Highest Unemployment Levels

West Germany, the economic pillar of postwar Europe, is experiencing its highest unemployment levels in industrial centers since the '30s. Economic woes there were bad enough to topple the centrist regime of Helmut Schmidt, and mass demonstrations by unemployed workers have become common in several cities.

Economists feel that the West Germans are having an increasingly difficult time funding their broad range of social services during a prolonged economic downturn, and laid-off workers are determined to fight service cuts. Thus, real growth in West Germany next year will likely be from zero to about 1%.

A recent study conducted by European telephone organizations predicted that Sweden will become the most terminal-dense nation in Europe by 1986, with the number of installed terminals exceeding 30 per 1,000 employees. Meanwhile, 1983 will see a continuation of rapid and sustained growth in software sales in Sweden, supplied greatly by U.S. vendors, the report said. ■

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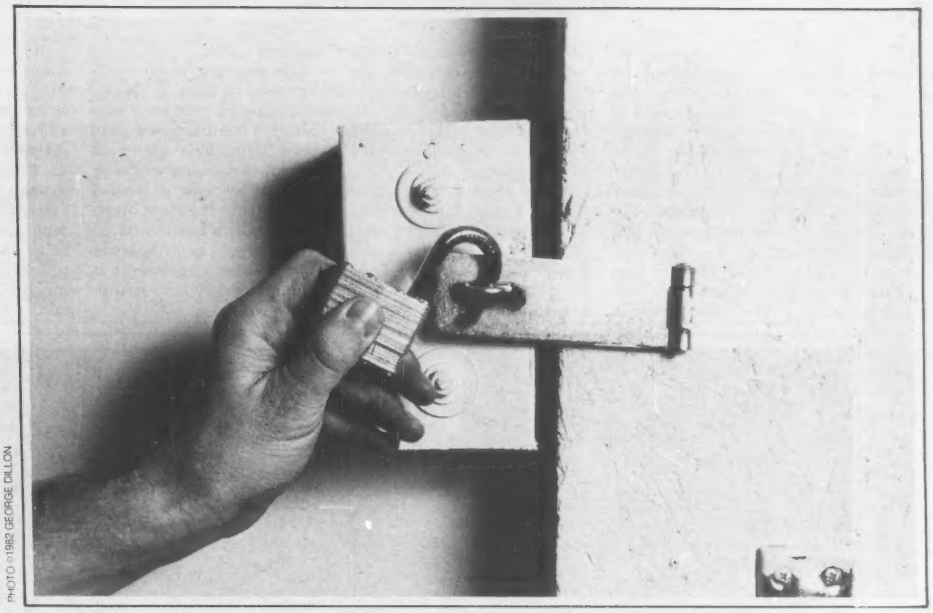

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Free Trade vs. Protectionism

Selling High Technology

By Jake Kirchner

The persistently stagnant economies afflicting most of the world's industrial nations have created a crisis in the trade relations between the U.S. and its major trading partners, all of whom are counting on increased exports to create jobs, provide much-needed capital and, in general, bring relief from their fiscal despair.

Despite the best efforts of committed free traders in America, Europe and Japan, there now seems to be little hope of avoiding the escalation of protectionist sentiment at home and abroad into a trade war of major proportions. The resulting conflict promises to have major negative implications for American providers and users of data processing and telecommunications.

The long-hoped-for international economic upturn, now expected sometime in 1983, could ameliorate the global trading frictions. However, most observers expect things to get worse before they get better. The situation has prompted no end of international finger pointing and scapegoating, but there is also no lack of consensus about the true culprits in this diplomatic maelstrom: record-breaking unemployment, disastrously high interest rates, unstable and unrealistic currency exchange rates and the naggingly flat economic growth in most developed nations.

"The great risk of economic stagnation is that domestic unemployment and financial difficulties may lead to trade protectionism as an expedient method of protecting domestic jobs and shielding local companies from import competition," Sidney L. Jones, resident scholar at the Washington, D.C., American Enterprise Institute and director of the institute's current international trade project, wrote in a recent paper on trade policy issues. "Protectionism is always a potential risk, but the explicit pressure to 'do something' becomes much more intense during periods of economic stagnation."

In the U.S., the pressure on Congress and the Reagan administration "to do something" has risen steadily during the last few years as American farmers found it increasingly difficult to compete for overseas markets against the heavily subsidized agricultural exports of the European Community, and as U.S. industries were buffeted by competition from low-priced steel, automobiles and semiconductors from abroad. Our allies, in turn, cite the U.S. for its quotas on cars, steel and textiles, as well as our subsidies of sugar and dairy products.

Most protectionist activities are defended as temporary, needed only until the economic situation improves enough once more to make free trade financially and politically acceptable. But with the lingering economic malaise, rapidly growing trade restrictions threaten a serious breakdown of the international trading system.

With this in mind, the Reagan administration decided almost two years ago to seek a high-level meeting of the 88 signatories of the General Agreement on Tariffs and Trade (Gatt), the loose organization whose treaties have formed the trading "rules" for most of the world during the past 34 years. The resulting ministerial meeting of the Gatt was held in Geneva, Switzerland, in late Novem-

(Continued on Page 60)

Jake Kirchner is a Computerworld *correspondent based in Washington, D.C.*

(Continued from Page 59)

ber, the first such high-level gathering in eight years.

Ambassador William E. Brock, U.S. trade representative, led a 42-member U.S. delegation seeking a commitment of the 88 members to halt protectionism and work toward relaxation of trade barriers. In addition, the U.S. wanted the Gatt organization, which covers trade in goods, to begin looking at the feasibility of including in the Gatt structure issues of high-technology trade and trade in services, such as data processing, insurance and banking.

Depending on whose account of the acrimonious five-day meeting you hear, it was either held at the completely wrong time or just in the nick of time to save the Gatt compact. The national delegations to Geneva argued long and hard, and the pressure on the delegations to 'defend their countries' trade policies nearly wrecked the undertaking. Brock and his fellow Americans argued that the economic situation is precisely the reason the Gatt countries must recommit themselves to free trade, before a global trade war becomes inevitable.

'Seriously Endangered'

In the end, the Gatt members signed a 17-page communique stating their recognition that "the multilateral trading system . . . is seriously endangered." The document continued: "Conscious of the role of the Gatt system in furthering economic well-being and an unprecedented expansion of world trade and convinced of the lasting validity of the basic principles and objectives of the general agreement in a world of increasing economic interdependence, the contracting parties are resolved to overcome these threats to the system."

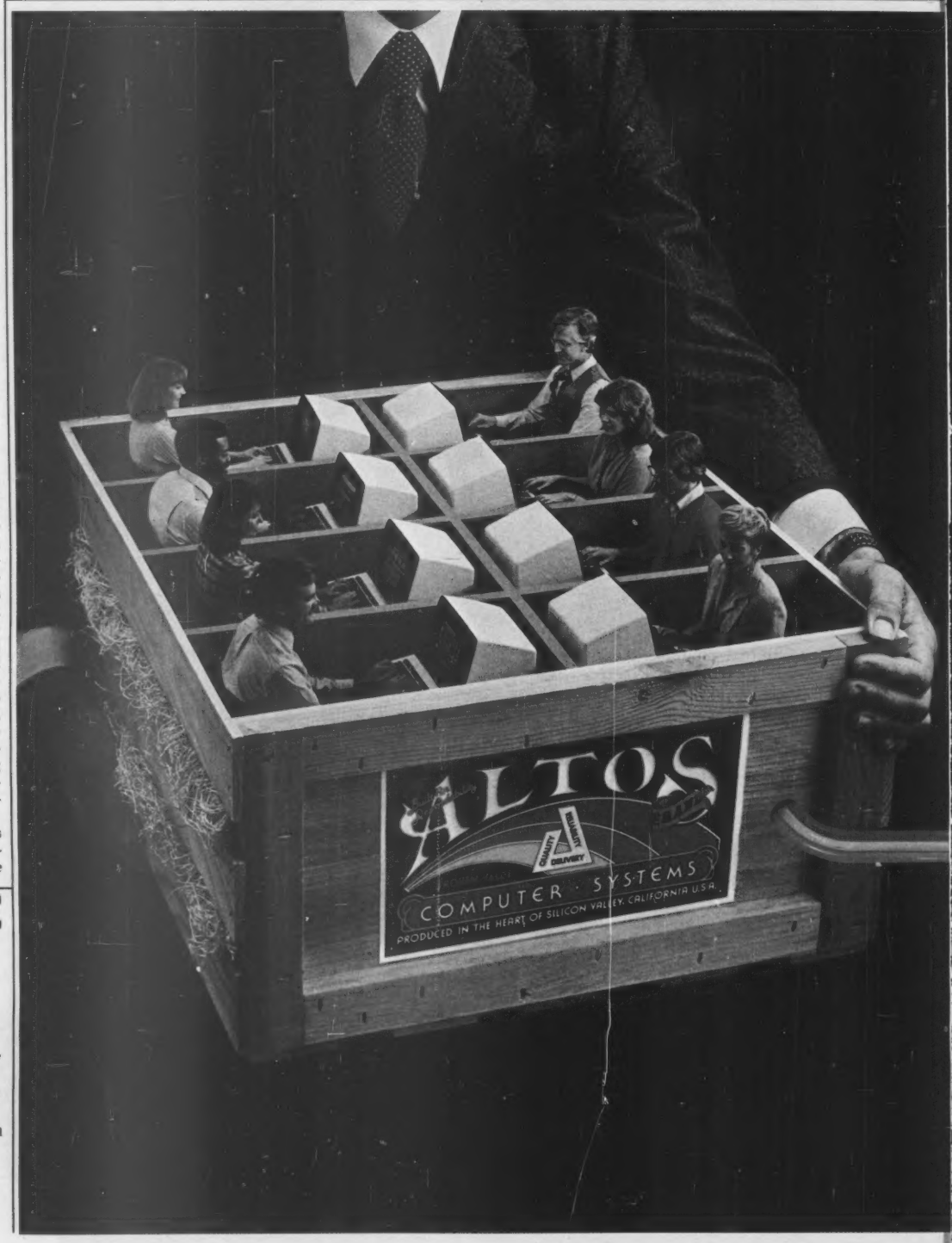
If the communique was something less than an ambitious action plan for free trade, it was a rousing endorsement of openness principles when compared with the lack of success the U.S. had in promoting services and high-technology issues in Geneva. The American proposal for a work program in high techology was scuttled by opponents to the U.S. approach.

In services, the work program approved was less than exciting. The most to which the Gatt members would agree was to consider discussing services-related topics among themselves in preparation for taking up the subject at a planned 1984 Gatt meeting.

Brock pointed to the "very fuzzy" wording on services in the communique and said, "I'm not very happy with the words we got, but at least we'll continue to draw attention to this problem over the next two years."

Commenting on the meeting's results later in Washington, Brock noted the near failure of the discussions and said it "could have been a disaster. The avoidance of tragedy and at least a limited movement in the right direction is really a healthy sign." The proof will be in how the limited Geneva agreement is implemented by the signatory governments.

It is noteworthy that the European Community immediately voiced its reservations about the communique and emphasized its right to interpret it as seems best for its interests. At home, the Reagan administration acknowledged that the communique is likely to have little effect on the protectionism sentiment rising in Congress. But, Brock said, the document at least



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gives the administration some ammunition against protectionism here in that it can be waved when arguing before Congress that "if you act like idiots [and give in to protectionism], we're going to pay."

Brock acknowledged the hard fight the administration faces with Congress. Indeed, the battle was joined in earnest immediately following the Geneva meeting. Senate Finance Committee Chairman Robert Dole (R-Kan.), also a delegate to the Gatt meeting, commented that "the climate is now right for protectionist measures in Congress . . . I hope we don't get in a big trade war, but we'll be under a lot of pressure to teach somebody a lesson or show that we mean business."

Sen. Charles E. Grassley (R-Iowa), another Gatt delegate and member of the Senate Finance Committee's International Trade Subcommittee, put it even more forcefully, telling his colleagues that it is "apparent to me that Gatt either cannot or will not handle the difficult and complex areas of nontariff barriers, export subsidies, import licensing, trade in services, investment and high technology . . . The time has come," he said, "to let our trading partners know that we are no longer willing to tolerate one-way streets."

Sen. James J. Exon (D-Neb.), a member of another Senate trade subcommittee, called the Gatt meeting "a disaster," the communique "a sham." Exon stated, "We have been taken for a 'trade ride' far too long, and Uncle Sam can no longer afford to play Santa Claus."

The reaction was no milder in the House of Representatives, where Joesph M. Gaydos (D-Pa.) berated what he called Japan's "samurai" trade tactics and declared that "our patience is not without limit." Similarly, Rep. Toby Roth (R-Wis.), a member of the House Foreign Affairs Committee, said, "We have to show that we have some muscle . . . I think it is about time we send a signal and tell the rest of the world that we will not be taken advantage of in trade policies."

In Washington, then, the political climate is ripe for protectionist legislation. This has been increasingly true for the past several years, but trade topics took on a new urgency for national politicians during the recent elections, when senators and congressmen heard over and over from their constituents that the number one problem is unemployment. If we can't add jobs through trade, we can at least stop the erosion of employment caused by foreign imports, the argument goes.

Many lawmakers, including such influential members as Sen. Edward Kennedy and Speaker of the House Thomas P. O'Neill, returned to work during the lame-duck congressional session committed to pushing a domestic content bill that would require all cars sold in this country to have as much as 90% of their parts American-made. This bill, with overwhelming support in the House, may be stalled in the Senate and faces a presidential veto if eventually passed.

Clearly Worried

However, the administration and trade groups espousing free trade are clearly worried about its implications and the precedent it might set. If Congress is willing to protect U.S. auto makers, the reasoning goes, where will it all end — with steel, textiles, agricultural goods, computers?

"We can all stand up and make speeches about fair trade, free trade, protectionism — whatever it might be, but we all live in the real world," Dole said about the political pressure to do something about the trade imbalance. "There's a great deal of concern all across the country about how we're going to find jobs. The bottom line is there's a lot of politics in this — not partisan politics, but survival politics. Most people like being members of Congress."

In general, then, trade now has an enticing political

(Continued on Page 62)

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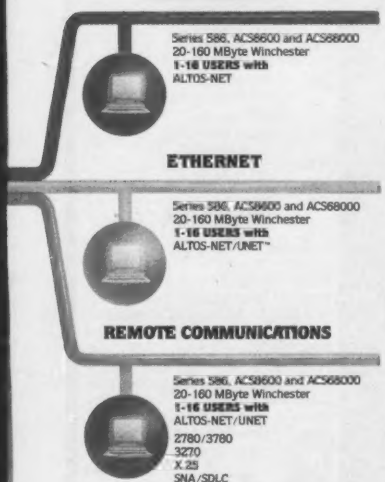

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(Continued from Page 61)

cachet. This was never more evident than during the recent campaign when Democratic presidential hopeful Walter Mondale elicited tremendous enthusiasm as he stumped the country inveighing against Japanese imports. While Mondale's speeches can be dismissed as tub-thumping campaign rhetoric, a more subtle transformation is occurring within the Democratic party as a whole, led by a group known popularly as the "Atari Democrats."

The Atari Democrats — young politicians typified by presidential candidate Sen. Gary Hart (D-Colo.) and House Telecommunications Subcommittee Chairman Timothy Wirth (D-Colo.) — espouse a philosophy that says the aging "smokestack" industries need to be protected but that the nation's real emphasis should be on electronics and other high-technology industries, which they see as America's future job providers and income producers. These economic sectors have been targeted in some of the nearly two dozen reciprocal trade bills now before Congress, which would set import strategies based on U.S. access to foreign markets.

"What seems to be emerging from the younger Democrats . . . the neo-liberals, or so-called Atari Democrats . . . is the recognition that the ground rules have changed, and we have to look out the front window rather than through the rearview mirror, and we cannot apply the policies of yesterday to the problems of tomorrow and that . . . whether or not those policies were good in the past, they're no longer complete," noted Washington, D.C., consultant Arthur Bushkin, a former high-ranking official of the National Telecommunications and Information Administration.

According to Bushkin, now president of the Washington, D.C.-based Telemation Associates Inc., "We've got to look at investment in the knowledge industries. If

(Continued on Page 66)

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Bushkin Terms Protectionism 'Disastrous'

A recurring theme in the debate over whether the U.S. should impose restrictions on high-technology imports is that although such restrictions may benefit American industry in the short term, the long-range outcome would be disastrous. Arthur Bushkin, a former National Telecommunications and Information Administration official, argues this point forcefully.

"I have talked with many government people from other countries," said Bushkin, now president of a Washington, D.C.-based consulting firm, Telemation Associates, Inc. He has concluded that "once you get into a retaliatory spiral, each country tries to protect the areas where it feels it needs protection.

"The general consensus seems to be that if we start down the road to increased protectionism — or if we go much farther down the road, because we're already starting down the road — other countries that are not as well positioned as the U.S. in high technology will start placing restrictions in those areas where the U.S. is very strong," Bushkin said.

A Very Good Position

"We hear a lot about our problems with Japan, but certainly relative to the rest of the world we're in a very good position. And once you begin to legitimize protectionism as an approach, then other countries, seeing the importance of high-technology goods and services computers, telecommunications," will want to protect those areas, he said.

"High technology is a global market, communications is a global market . . . And the failure of the recent ministerial meeting at the Gatt [General Agreement on Tariffs and Trade] to put the brakes on protectionism jeopardizes the high-tech companies, because it is an area where we have the most to lose, quite simply."

When asked how the U.S. should respond to what is widely seen as Japanese resistance to trading fairly in high technology, Bushkin responded, "It is important to recognize that every country, including the U.S. and Japan, has trade policies that are protectionist, and there's really two sorts of ways to solve that.

"One is for each guy to try to get tougher than the next guy, and that's the retaliatory spiral and everything gets worse, and ultimately you have an international gridlock.

"The second approach is for everybody to cool down and, slowly but surely, everybody back off . . . Now we're at a fork in the road [trying to decide] which of those two paths we take.

"There's no doubt there's room for improvement on all sides, and the fundamental point is that if we begin to get into a retaliatory mode, then everybody loses," Buskin said. "And if we can maintain some sense of perspective then everyone will benefit. Everybody loses when you start clamping down. There are short-term victories and long-term losses. I think the situation is going to get worse before it gets better and the question is how much worse." ■

Arthur A. Bushkin

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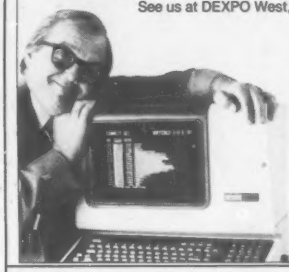

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White House Still Deciding on a Direction

The Reagan administration has been keeping a close eye on high-technology matters lately, but some members of the administration do not like what they see.

The preliminary draft of a study on U.S. competitiveness in high-tech industries made by the Cabinet Council on Commerce and Trade states that although "the United States retains broad leadership in computer hardware and software production and technology ... the Japanese have begun to close the gap in a variety of sectors." Specifically, the study states, "the United States no longer has the lead in several important areas of semiconductor technology."

Commerce Department official William Finan noted that when the Cabinet group polled about 50 chief executives of high-technology firms, it found "pretty much a consensus ... [that] there's reason to be concerned" about the continued competitiveness of U.S. industries, but no consensus on how to remedy the situation — whether by restructuring tax laws to encourage research and development and investment or by intervening more directly in trade disputes.

Sources in Washington, D.C., indicated that when the study was presented to the Cabinet in late October, several high-level officials urged high-technology import restrictions. No decision has been made on this yet; the assessment is undergoing further work at Commerce for final action early in 1983.

No White House Decision Yet

Nor has the White House made a decision on how to approach the problems of high-technology industries, according to sources close to the administration deliberations. Finan confirmed that point when he said the outcome of the project "is unclear at this point."

The forceful free trade position of trade representative William Brock has, for the moment at least, the backing of President Ronald Reagan, who in a Nov. 20 national radio broadcast said of protectionism: "[Some] call that getting tough. Well, I call it stupid."

But free trade sentiment in the White House is not necessarily all that strong. There is considerable pressure from elsewhere within the administration, particulary from the Commerce Department, to take a tougher stand, especially against Japanese imports. The point man in this push is Undersecretary for International Trade Lionel H. Olmer, a former Motorola, Inc. executive, who in December was part of the U.S. delegation to trade talks in Japan with that country's new government.

Olmer has been widely quoted of late arguing that the Japanese semiconductor competition threatens to cripple U.S. firms, potentially leading to eventual U.S. reliance on Japanese sources for critical military electronics items. Olmer is backed by Commerce figures showing that Japanese exports of integrated circuits to the U.S. doubled during the first nine months of 1982. The $346 million worth of Japanese semiconductors imported into this country was more than double the comparable U.S. exports to Japan of $118 million.

On the plus side, the U.S./Japan Work Group on High-Technology Industries recently developed a set of recommendations for resolving some of the high-technology conflicts between the two nations. The recommendations bind both governments to principles to "assure full mutual access to trade and investment opportunities and full national treatment for resident foreign firms in access to government-sponsored R&D programs and other national programs which provide advantages to domestic industries."

U.S. industry and government officials are now waiting to see what steps the new Japanese government will take to defuse this tense situation. The new Japanese prime minister, Yasuhiro Nakasone, in statements shortly after his election, promised resolution of trade issues with the U.S. will be a priority. ■

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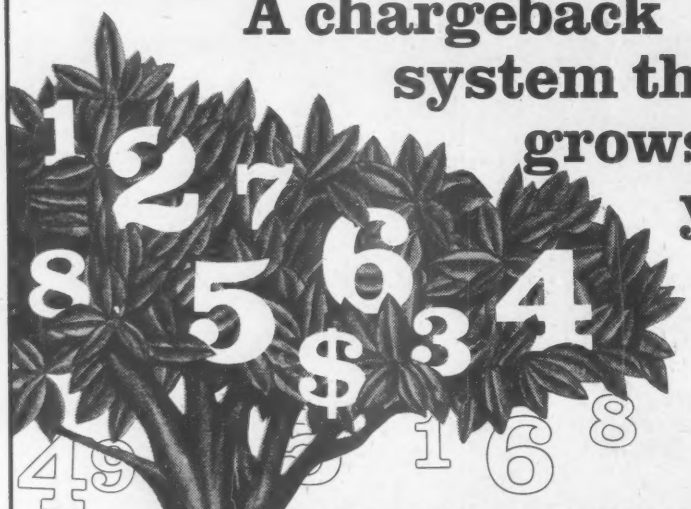

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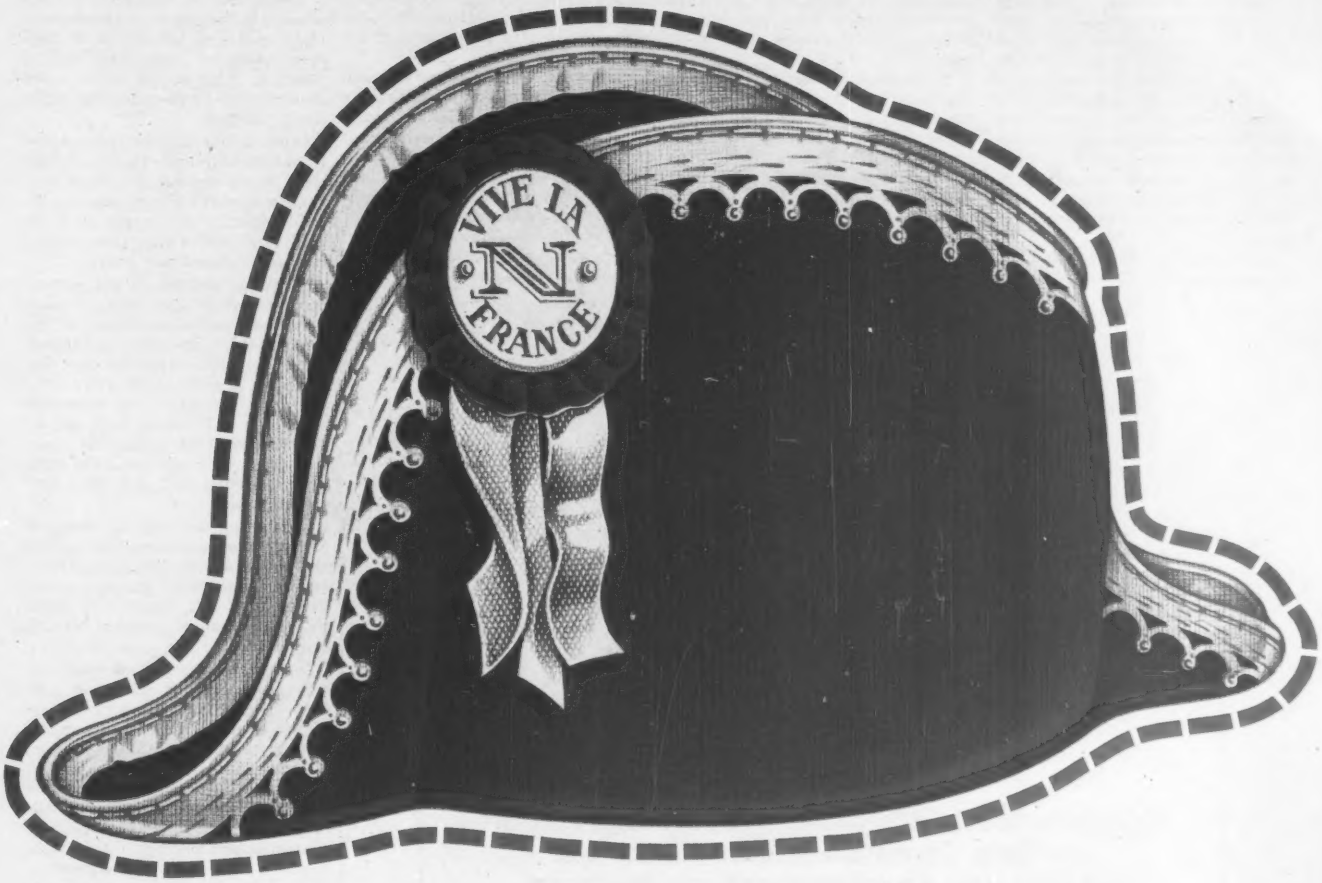

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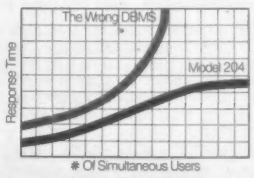

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(Continued from Page 62)

we're moving into an information society, then human capital is the most important form of capital. You've got to invest in human capital."

Bushkin added that "the new Democrats seem to recognize these issues, and the important thing they are doing, it seems to me, is not [to offer] any particular solution . . . but what they're doing is putting these issues into the political debate. These issues are central to the economic future of this country, and we cannot simply treat them as interesting issues relevant only to one sector. And that's what the Atari Democrats are saying."

One immediate effect of this addition of high technology to national political debate, Bushkin noted, is to spur the White House to become more involved in technology and trade issues. These topics are sure to be important in the 1984 presidential campaign, he said, and the White House knows it must put Ronald Reagan at the forefront of these issues.

If there is any consensus on these issues, it is that everyone benefits from an open trading system. But given today's economic problems around the world, there is little faith in the current negotiating structures' ability to ensure free trade. The prime instrument, the Gatt, seems a very fragile bulwark indeed. And there is sentiment here and abroad for scrapping that structure altogether if it does not prove adequate to the current challenge.

The U.S. Senate will begin hearings soon on the Gatt and its efficacy in the current geopolitical setting. Even the staunch free trader and Gatt apologist, Brock, admitted the Gatt organization may have outlived its usefulness.

But what the U.S. must refrain from doing at all costs, according to Brock, is to scrap the Gatt, or some equivalent negotiating mechanism, in favor of seeking more bilateral and multilateral agreements on our own. "The advantage is awesome" for the U.S. to be a member of Gatt, he said. "If we didn't have a Gatt we'd have to invent a Gatt."

Why? Because the U.S. is "the only truly global power in the Gatt." American firms trade in every country of the world, he explained and, therefore, need some trade structure to facilitate commerce.

Unfortunately, he added, our adherence to the Gatt's open trade principles makes us vulnerable to trade restrictions by individual trading partners. "One of the prices is we have to abide by the rules when they don't," he said.

Although it may be tempting to fight back with equivalent trade barriers, Brock argued, the short-term specific market advantages would be outweighed in the long run. If we don't stand up for the system, no one else will, is how Brock put it.

A quick rebound in the world's economy would give the open trade system a much-needed shot in the arm, but the outlook for that happening is not good, to say the least. Every analyst, from Nobel Prize winners in economics to corporate strategists, is planning with the assumption that the worldwide recession will be overcome only with great difficulty and only after considerable time.

And when the economy does get better, there are some industries that will never recover. Millions of workers displaced during the past two or three years will never find reemployment in their previous occupations.

Every developed industrialized nation now understands, at least to some degree, that the future is in high technology. The U.S. government is now being sensitized to this; European countries and Japan have understood this very well for some time and have made considerable progress in developing national strategies for fostering and cultivating their high-technology sectors.

And so the scene is set for a major and protracted trade war in numerous high-technology areas. The imminent trade battles in the automobile, steel and agricultural sectors will only exacerbate the situation and accelerate the trend toward high-technology protectionism. ■

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Forecast '83

The Semiconductor Industry

1983 Will Get Better . . .

By Robert Batt

For the semiconductor industry, which has prided itself on continuous double-digit growth, the last two years have been uncomfortable.

Beset by the recession, increasing competition from the Japanese and price attrition across all product lines, the major U.S. chip manufacturers will post lower earnings for 1982, with the industry overall growing 5%. However, 1983 is shaping up as a transition year, with most industry pundits forecasting a stagnant first half followed by a modest recovery in the second six months.

In fact, most analysts see 1983 as a time to gear up for the boom expected in 1984. Dataquest, Inc. of Cupertino, Calif., for example, forecasts that the semiconductor industry will grow 13% next year, mostly in the fourth quarter.

Many companies within the semiconductor industry are hoping that the belt-tightening measures they took in 1982 will pay off in the next 12 months. According to Seth Goldwin, an analyst at New York-based Paine Webber, Mitchell Hutchins, in the last year many semiconductor vendors concentrated on controlling costs through discipline in manufacturing processes, layoffs and extended work weeks in the hope that when the recovery comes, they will emerge in good condition.

The semiconductor vendors themselves are upbeat about their prospects. Keiske Yawata, president of NEC Electronics USA, Inc., for example, predicts a growth rate of 20% in the coming year compared with 1982. Most of the growth will come in the second half of the year and will occur mainly in the high-technology product sector, according to Yawata.

"The higher the technology you use, the greater the return on your investment," he said. "Those companies which have updated their processing capabilities will be in the best position to compete."

According to Tom Hinkelman, executive director of the Semiconductor Industry Association (SIA), 1982 was as much

(Continued on Page 70)

Robert Batt is a Computerworld *West Coast correspondent.*

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(Continued from Page 67)

a year of price recession as it was of volume recession. Overcapacity, he claims, led to weak prices.

Once the physical demand for semiconductor products picks up, there will be an upturn in prices and profits, Hinkelman predicts.

A Deceptive Season

Some companies, eager to be at the forefront of any upturn in the economy, were premature in their assessment of the industry's fortunes. Last spring, order rates surged, and companies like Intel Corp. and Advanced Micro Devices, Inc. (AMD) began preparing for the recovery they were sure was just around the corner. However, the surge in orders was only temporary, and Intel, which had hired 3,000 extra people, was forced to impose a salary freeze.

Despite expressed hopes that 1983 will be better, not everyone is convinced that the worst is over. "The real problem is that the computer industry in 1982 was not the vibrant force that it usually is for a component market like semiconductors," observed James Magid, analyst at L.F. Rothschild, Unterberg, Towbin, Inc. of New York. "Nor will it be in 1983.

"We are now going into the steep part of the recession. There are likely to be shortages and dislocations over the next six months, and the leading companies are likely to dominate production at the cost of the smaller vendors."

The consumption markets for semiconductor products — the computer industry, for example — are for the most part reliant on heavy capital expenditures. Because of this, the semiconductor industry is less prone than in the past to lead the economy out of a recession, several analysts have noted.

Paine Webber's Goldwin explained, "The cost structure of semiconductor manufacturing is one of high fixed costs and low variable costs. When a vendor goes below the break-even point, he loses a lot of money; above that point, he starts making a lot of money."

While some areas of business for the semiconductor industry have been doing well — like video games and personal computers — these pockets of strength have not been strong enough to offset such weak areas as the mainframe and minicomputer markets. "The recession has crimped demand," Magid said. "Computer users are no longer in control of their requirements, and this has had an enormous influence on semiconductor components."

Realignments Ahead?

The enormous demand for semiconductor components for toys and games has led to a discombobulation in the market because of the extra pressure put on discrete semiconductor components, Magid explained. "If the current trend continues, some companies will not survive in their present form."

Other industry analysts contacted by *Computerworld* agreed with Magid. Among the companies believed heading for major management changes in the year ahead are National Semiconductor Corp., AMD and Texas Instruments, Inc.

Some analysts believe there could be realignments within the industry. "There are companies which are cash-short and whose stock values are such that they will be attractive to prospective buyers. Because these companies need to invest, they will be subject to takeovers," SIA's Hinkelman predicted.

However, in a recent speech to analysts and vendors in San Jose, Calif., Tad La Fountain, vice-president of research at the New York brokerage house of Shearson American Express, warned that the joys of ownership are not always what they seem to be. "Buying businesses in a high-growth industry where capital infusions can promote long-term viability makes sense; paying up for them does not. A lot of captives have worn out their welcome with their parent's finance committees, particularly the broadline manufacturers who are subsidiaries of large corporations."

Many vendors are looking for a continued growth in demand for their components from the small systems manufacturers to offset weaknesses in the higher reaches of the computer market. Although computer companies as a whole experienced a slower year than usual, several firms, such as Tandem Computers, Inc., Digital Equipment Corp. and Prime Computer, Inc., had sizable growth rates and continued their demand for chips.

It appears that in the year ahead, semiconductors will continue to be a business related to capital spending despite rapid growth in the consumer segment and the $1 billion military market. Continued emphasis on research and development is a must, and those companies that have invested in the latest processing technology will be in the best position to take advantage of any boom in the economy.

As Magid put it, "The industry a year from now will have gone through a very hazardous period. Right now the outlook for some is dismal and management will be severely challenged in the year ahead. But there will be survivors for whom the outlook is one of three to four years of spectacular growth." ■

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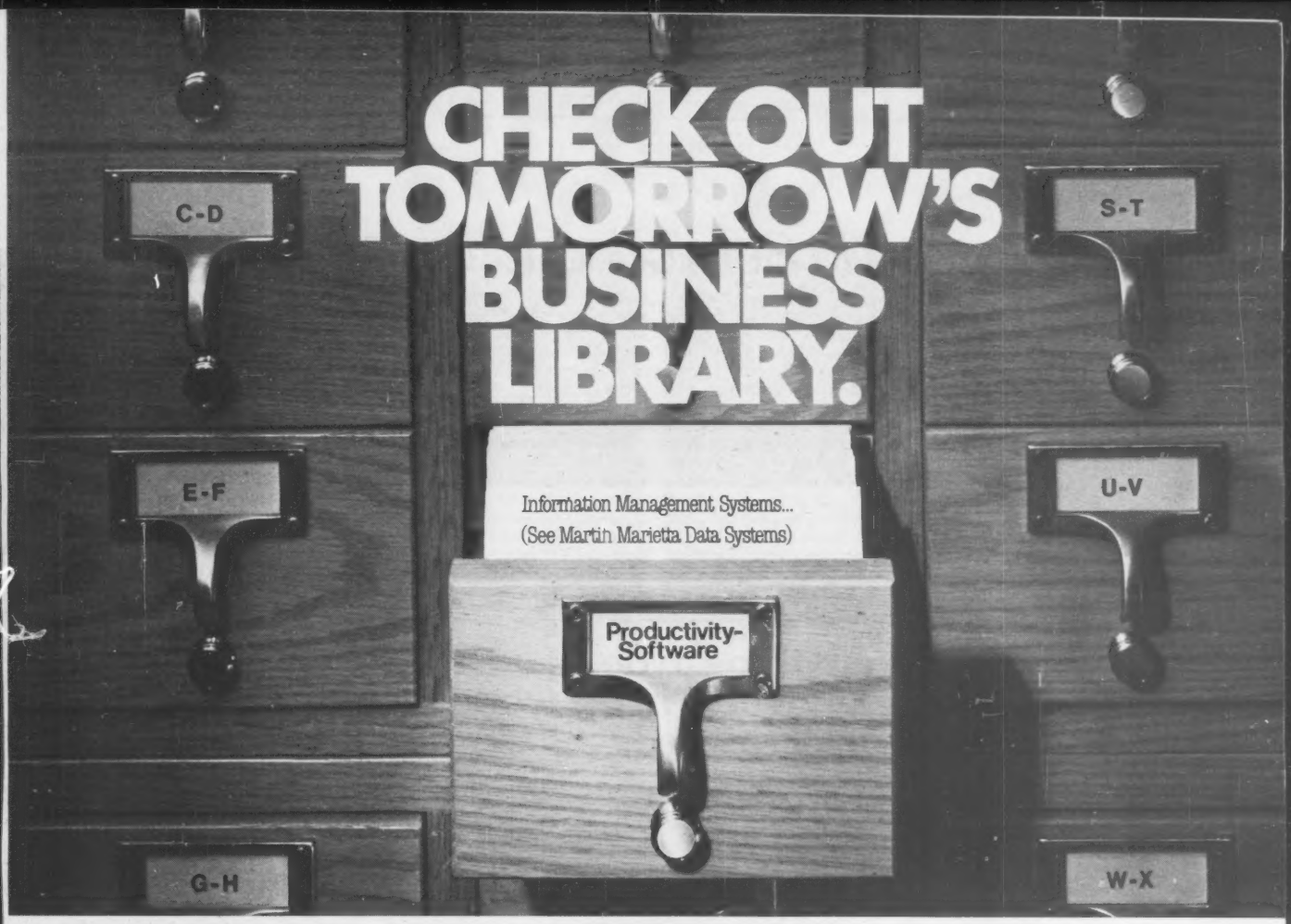

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Who'll Succeed in Semiconductor Arena in '83?

When it comes to predicting which semiconductor vendors will do well in 1983, two issues are of crucial importance — the development of technology and the dexterity with which those developments are managed.

Most industry experts do not anticipate dramatic technological changes over the next 12 months. Instead, they anticipate evolutionary changes, if only because the expected boom in demand is believed to be only a year or so away, leaving no time to develop new technology.

The vendors that will succeed in '83 are expected to be those that have their market force in place and are set up to meet customer requirements faster than their competitors.

Many pundits believe the importance of software will dramatically increase because of the nature of very large-scale integration (VLSI) products. "We do not yet know what VLSI means in terms of product definition except to say it will certainly contain a lot of software," observed Keiske Yawata, president of NEC Electronics USA, Inc.

One of the intriguing questions for 1983 could be who owns the VLSI system — the manufacturer or the user who employs the system and utilizes the manufacturer as a kind of silicon foundry. "There will be lots of fights over this issue," Yawata predicted.

Trend Seen

Several analysts see a trend toward custom and semicustom gate arrays and cell libraries. The market is a popular one. The Semiconductor Industry Association estimates that 30 companies have entered this arena in the past year.

"The rationale is to offer software-based design tools to system engineers to dramatically drop the cost of manufacturing custom chips and thereby add to the flexibility of manufacturing," explained Seth Goldwin of Paine Webber, Mitchell Hutchins. One of the major ways U.S. manufacturers could continue to compete with their Japanese counterparts is to start offering a service rather than just a product, he said, citing design tools as an opportunity to do this.

Another area in which price competition is proving crucial is in the market for 64K-bit random-access memory (RAM) chips. Japan's initial domination of the market seems to have been blunted so that its market share is down to about 55% compared with 75% not long ago.

Next year is also expected to witness the development and introduction of several versions of the much-touted 256K-bit RAM.

In static memories, the issue for the coming year is whether U.S. manufacturers can wrest back the lead ceded to Japanese competition, particularly in the Cmos technology area.

In the fast-growing area of erasable programmable read-only memories, industry analysts predict that 1983 will see such industry leaders as Intel Corp. and NCR Corp. joined by others, most notably Motorola, Inc. and Texas Instruments, Inc. The challenge in this sector is to bring the products to market.

"In all these areas, management will have to select carefully those areas that are most meaningful to their companies and stay out of those markets which are not. Successful companies will be those that accurately focus on these developing markets," said Dan Kleisken, vice-president at Dataquest, Inc., a market research firm.

With the mainframe and minicomputer markets likely to remain sluggish through most of 1983, many semiconductor vendors are concentrating on increasing their performance in the personal computer market.

James Magid of New York's L.F. Rothschild, Unterberg, Towbin, Inc. said "microprocessors and developments in software will open up new vistas to personal computer users beyond anything now known." ■

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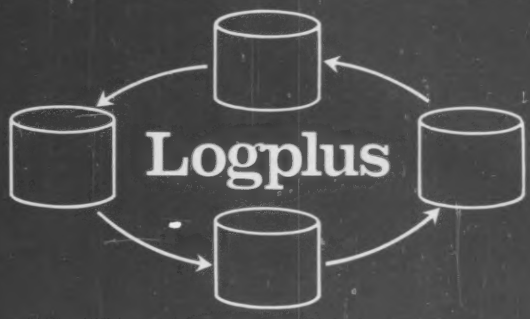

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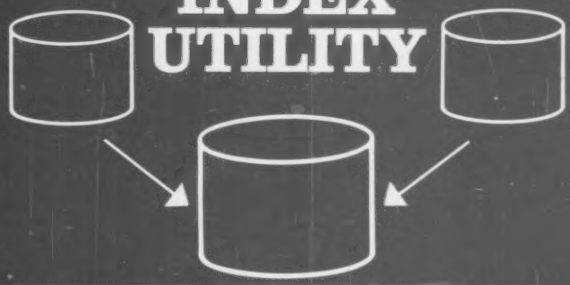

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Feds Expected to Squelch 'Gray Market'

A multiagency task force to control the so-called "gray market" in semiconductor devices was set up by the U.S. government last September. The project has since been placed on the back burner, however, as President Reagan turned his attention to clamping down on the narcotics trade.

Nevertheless, if 1982 — a year of sting operations, industrial espionage and sundry undercover activities — is any indication, the coming year will almost certainly witness an increase in efforts to staunch the illegal export of technology.

What is the gray market? It is an area in which dealings are neither black or white — a market in which chips are stolen and then sold to legitimate dealers, who do not question the chips' origins but resell them as if they had acquired them legally. The chip dealers essentially "launder" the stolen chips.

"The gray market is legitimate and illegitimate at the same time," explained Marvin Zietzke, corporate investigator for Intel Corp. "Part of the market is made up of dealing in stolen components and technological information, the origins of which are many and varied."

The market in stolen semiconductors and other micro devices is conservatively put at $100 million a year.

'The gray market is legitimate and illegitimate at the same time. Part of the market is made up of dealing in stolen components and technological information, the origins of which are many and varied.'

Much of this illicit trade centers on California's Silicon Valley, where just over a year ago Monolithic Memories, Inc. of Sunnyvale lost $2.7 million in semiconductor devices. Half of the stolen goods were recovered, but some of the remainder is believed to have reached the Eastern Bloc and the USSR.

According to Zietzke, the trail into the gray market often begins when a company employee steals some unmarked parts from his company's premises and then sells them to a dealer. The parts, while often untested, are re-marked by the dealer as if they were tested and then either sold abroad, often to East Asia, or to the original company's competitors.

There is also a reverse trade. Employees of the large chip manufacturers that have assembly plants in Asia siphon off parts on their way to the U.S. Those parts find their way into the gray market and end up with some street vendor in Hong Kong, for instance.

With some semiconductor devices, such as microcontrollers, currently in high demand, gray market dealings can be very lucrative. According to Richard Camps, vice-president of Barrick Security Group, a San Mateo, Calif., securities organization that has served as an investigator for several Silicon Valley firms, many electronics dealers indulge in this market.

"Seventy percent of their dealings are legitimate, but if the deal looks right they will close their eyes to dubious products," Camps said. "They have fence reputations."

The federal task force formed last September has been welcomed by semiconductor vendors worried about breaches in their security operations. "Strict controls need to be put in place. There are a lot of holes in the organizational structures of many companies which have grown rapidly over a few years," Zietzke said. "As they mature, hopefully their procedures and security will be buffered."

Putting such controls in place, however, is not that easy. Integrated circuits, for example, are difficult devices to monitor constantly. Companies are faced with setting up a security system that works while not placing intolerable controls on employees.

There are those who argue that the gray market is of the manufacturers' own making. One dealer accused of dabbling in the gray market commented, "The semiconductor industry contains some of the slimiest people in business. It's a profitable industry, but the people in it are not the greatest, particularly at the higher areas of management. Many of the large companies are intrinsically dishonest."

While those not quite so close to the action talk in more dispassionate terms, there is still some agreement that semiconductor vendors are not entirely blameless.

Explained Bob Zook, a high technology management consultant at Arthur D. Little, Inc. "It's a fairly unsophisticated market still and its rapid growth has led to some nebulous marketing channels." In a supply-and-demand situation, those who have an excess of parts sell to those who are in need of them. It's very difficult for an end user to keep an optimum amount and when it comes to standard chips, he will often go to any source from which he can get them. In such a situation, a second market grows up and is susceptible to dubious practices." ■

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Semi Market to See Either Japanese Response

One issue certain to be at the forefront of computer industry news next year is that of Japanese competition in semiconductors. The coming 12 months will either see the Japanese respond to U.S. grievances or the start of a trade war that could have profound implications for Western industrial democracies.

If semiconductor trade conflict between U.S. and Japanese manufacturers continues and if the Reagan administration succumbs to pressure to introduce legislation against the Japanese, the consequences will be very serious, according to Keiske Yawata, president of NEC Electronics USA, Inc.

"If the administration introduces a lot of nontariff barriers, the Japanese business in semiconductors will be badly affected because much of Japanese industry in the U.S. is based on offshore manufacturing. If the U.S. imposes barriers, the Japanese will reciprocate and we will have a version of what I call semiconductor war," Yawata warned. He advised U.S. observers not to underestimate Japan's ability to take countermeasures against the U.S.

While Yawata regards this as a "worst case" scenario, he believes that if the economy continues to be sluggish, the chances of such an outcome increase.

Japanese Bluffing?

Many U.S. observers of the semiconductor scene, however, think the Japanese are bluffing. According to Tom Hinkelman, executive director of the Semiconductor Industry Association (SIA), there is no possibility of semiconductor war.

"The numbers just don't add up for the Japanese," he argued. "Any reaction the Japanese make to U.S. measures will hurt the Japanese more than the U.S."

Hinkelman claimed Japan is in clear violation of the General Agreement on Tarrifs and Trade because it has failed to open its domestic market to overseas semiconductor competitors and because it has continued to provide subsidies to its manufacturers.

The SIA chief warned that a protectionist spirit is already afoot in the new U.S. Congress. "Given that a third of our business is overseas, we [the SIA] do not believe protectionist legislation is the answer, but we are afraid that Congress will run with this to the detriment of all concerned," Hinkelman said.

In recognition of the gravity of the situation, the U.S. and Japanese governments agreed in November to monitor the performance of their respective semiconductor sectors in the other's market. The outcome will be of vital interest to users of data processing equipment.

Explained Seth Goldwin of New York's Paine Webber, Mitchell Hutchins, "The users have a vested interest in the survival of a strong U.S. semiconductor industry. The pace of innovation in computers has come from developments in semiconductor technology. This in turn has been a major engine for reducing end-user prices."

Main Beneficiary

"So far, the user has been the main beneficiary of the rise of the Japanese. But if low profits drive U.S. manufacturers out of business, these advantages will disappear."

This is because the end-user advantage depends on maintaining a balance between U.S. and Japanese vendors, Goldwin explained. If one begins to predominate, cost reductions become less likely and innovation is

to U.S. Grievances or the Start of a Trade War

slowed down as the cartel tries to hold onto its market base.

One of the major advantages enjoyed by Japanese semiconductor manufacturers results from the nature of business arrangements in Japan. Capital financing in Japan is heavily debt-oriented, which allows semiconductor vendors to look at long-term cash flow rather than accounting earnings.

As a result, in times of recession the Japanese vendors can cut prices and sell more even at the cost of short-term profits.

Such practices have forced U.S. manufacturers to do likewise. Because of a different business culture, however, the American companies have seen their profits heavily impacted.

"If Japanese companies go for market share, they will be able to tolerate lower prices and lower profits than overseas companies over the long run," Goldwin asserted.

Many analysts are now convinced that the Japanese have made worldwide dominance in semiconductors a top national priority. Their strategy is to "outmarket" anyone in the areas in which they are strong — for example, Cmos technology — and to catch up rapidly in the areas where they lag.

Companies such as Hitachi, Ltd. and Fujitsu Ltd. are making a big push to develop some kind of microprocessor capability to reduce U.S. domination (by Intel Corp., among other U.S. firms) of the Japanese market in that area.

James Magid, an analyst at New York-based L.F. Rothschild, Unterberg, Towbin, Inc., predicted that in 1983 the Japanese will have a major breakthrough in semiconductor components for the personal computer market and that by 1986 they will be in a position to dominate the Cmos market at the expense of the U.S.

New Spirit

Such potential developments have led to a new spirit of cooperation among US manufacturers determined to pool their resources to meet the Japanese threat. Many companies are now sharing research and development knowledge and working on alternative source arrangements in a way unheard of even 12 months ago. With almost a "back-to-the-wall" mentality, suppliers and users are in closer cooperation than ever before.

"We need to do everything we can individually and collectively to meet this challenge," said Jim Fiebiger, corporate vice-president at Motorola, Inc. "There is an attitude among U.S. semiconductor manufacturers to work much more closely together and utilize resources.

"At the same time, there is a recognition that we are not playing within the same ground rules as the Japanese. The U.S. market is open and the Japanese one is not, and I think we may see some government action to fix these things." Fiebiger also suggested that the rules governing intracompany cooperation be relaxed to allow for a more concerted U.S. effort against the Japanese.

This view of the situation is not, of course, shared by Japanese manufacturers. NEC Electronics USA chief Yawata accused U.S. semiconductor vendors of putting pressure on U.S. distributors not to buy Japanese products. "Some people are also being told by U.S. semiconductor manufacturers that soon there will be regulations and Japanese companies will have to reduce their operations in the U.S," he added. ■

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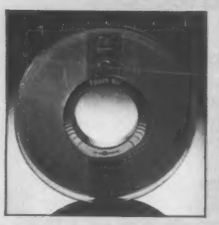

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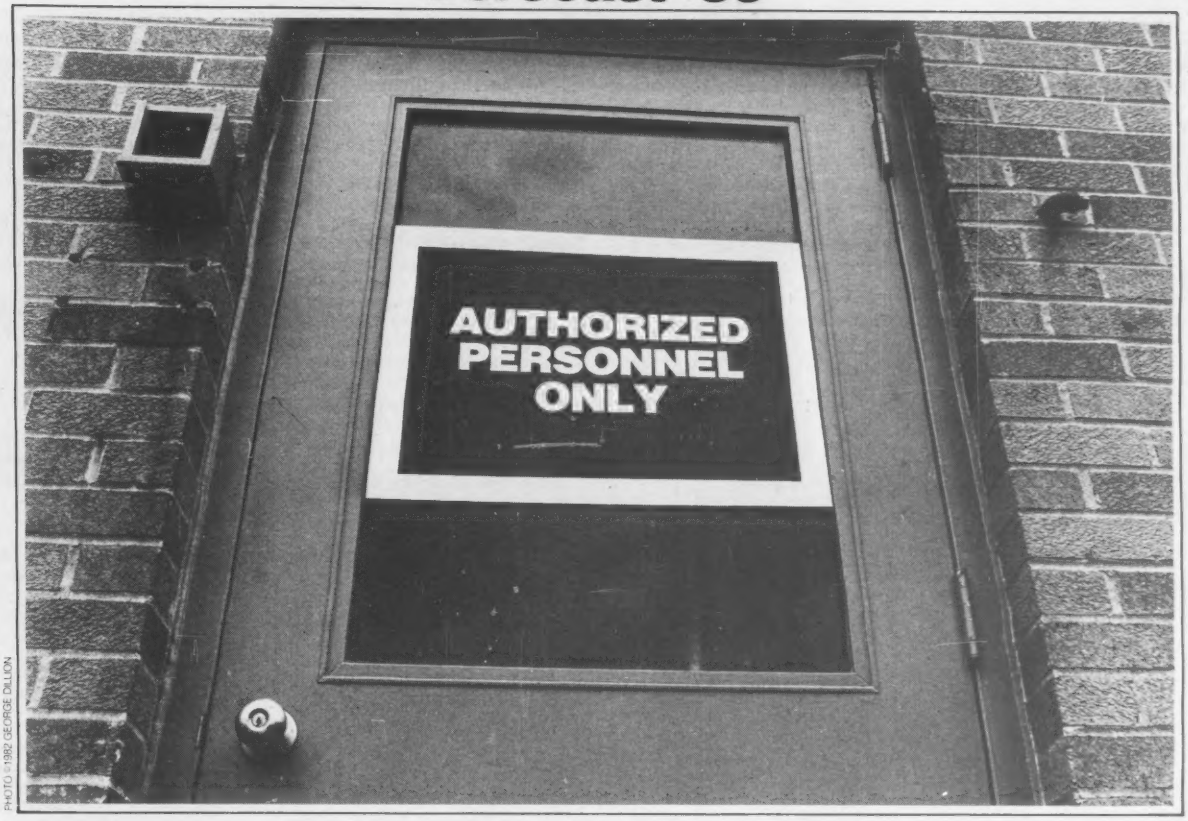

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Technology Under Development

A Look Behind Closed Doors

By Tom Henkel

Industry watchers are forever abuzz over new technologies, how they change the face of data processing and how things will be better in the future.

Computers that think, storage systems that incorporate data and visual information, lightning-fast processors and communications systems that can run rings around current technologies have all been touted as being right around the corner. In fact, those technologies all exist today; you just can't buy them yet. Ironically, computer makers devoted to catching the speed of light on tiny pieces of silicon are sometimes slow to announce products that are based on new technologies.

There are many factors that influence a firm's decision on when to announce a new product. For instance, as systems become more complex, it becomes more difficult to prove a new technology works well enough to make it an integral part of a company's product line. Issues like compatibility, upgradability, developing good mass production techniques and maintainability are strong considerations in whether to offer a new technology as a commercial product.

Another strong deterrent is the fear of being wrong or at least slightly behind the technological times. While the firm first to announce a new technology often wears the laurels of a trend setter, a technology that fails is an embarassment. To big companies, such an embarrassment can be a painful lesson. However, to smaller firms, these embarrassments can prove to be fatal.

Probably one of the most talked about technologies of this century is computers that do the thinking for you. Artificial intelligence, a software design technique that basically allows a processor to make decisions based on a set of ground rules, is one of the first steps in that direction. So far, the technology has remained a plaything of university scientists and large corporate research and development departments. But it may not be long before artificial intelligence makes a gradual appearance on the commercial front, according to Howard K. Dicken, president of DM Data, Inc., a Scottsdale, Ariz.-based consulting firm specializing

(Continued on Page 80)

Tom Henkel is a Computerworld *writer/analyst.*

(Continued from Page 79)

in artificial intelligence.

Dicken maintains that a handful of companies, mostly small firms, are now offering programs that qualify as true efforts of bringing artificial intelligence to the commercial sector. For the moment, most of those programs are aimed at fairly specific application areas, such as genetics research and oil exploration.

There are still problems with artificial intelligence. "We don't know how an expert thinks," Dicken maintained, adding that giving a programmer the task of developing smart software based on interviews with experts on a given field is extremely difficult.

Most developers of artificial intelligence software spend weeks interviewing people who mentally make decisions and draw conclusions on a given subject.

But summing up a lifetime or several lifetimes of knowledge in the form of a program often leads to a trivial treatment of the subject. Even worse, it sometimes results in a package that develops erroneous conclusions, Dicken said.

Despite recent developments, artificial intelligence is far from being considered a trend in terms of commercially available software. Most big computer companies, such as IBM, Texas Instruments, Inc. and Digital Equipment Corp., have internal artificial intelligence packages, according to Dicken. But none have announced a commercial product.

The reason those companies haven't announced artificial intelligence software is that a general package is almost impossible to produce. Very specialized packages, on the other hand, have limited audiences and can be difficult to cost justify in a large corporation.

The first true artificial intelligence packages will probably come from small companies that often can make a handsome living selling packages that appeal to a finite number of users, Dicken pointed out.

However, at this point, few smaller companies are equipped to offer a full-fledged artificial intelligence package.

Over the next few years groups of smaller companies will most likely join forces, combining bits of artificial intelligence knowledge, to develop full-fledged packages. Those packages will then be offered to system users or picked up by the larger vendors and offered as part of specially designed systems, Dicken maintained.

The Storage Controversy

Current methods of storing data have long been criticized as lagging behind improvements in processor technology. Today, a controversy appears to be brewing over whether magnetic media storage devices or new optical storage devices will win the favor of systems developers.

Proponents of optical recording techniques say data etched into record-like disks is more durable than magnetic recording techniques and offers the big advantage of being able to store pictures, graphs and copies of actual documents along with standard data.

Critics of the technology point to the fact that, at present, information stored on optical disks cannot be erased. The Japan Broadcasting Corp. recently developed an erasable video disk, but it is still very much in the prototype stage.

Another drawback is the optical disks' inability to retrieve as much data at a given time as current disk drive technology.

Supporters of optical techniques note that some vendors, particularly the Japanese, are currently working to develop erasable optical disks and faster ways of recording and retrieving data. Proponents of the technology also note that in some ways a nonerasable optical disk can prove an advantage, providing an excellent audit trail.

However, finding a place to store many disks, coupled with the current relatively high cost of optical disks, appears to be a disadvantage.

Just as ways of storing data have drawn criticism, ways of shuttling it around have been called inadequate as well. Some industry watchers contend that with more and more users getting into networking and data transmission, there is a stong possibility that there won't be enough frequencies available to give everyone a unique avenue for transmitting data.

Communications analyst Dixon Doll, president of The DMW Group, Inc., an Ann Arbor-based consulting

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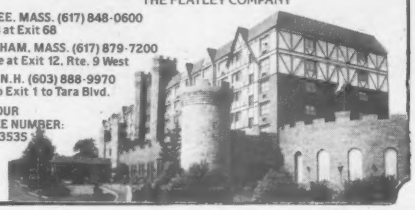

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firm, notes that DPers in large metropolitan areas, such as New York, are already feeling pinched by limited data transmission frequencies.

Doll noted there are several technologies that can expand data transmission frequencies, but none have received strong attention from developers of communications products. The reason, Doll explained, is largely because the demand for such products is still soft.

Digital termination systems (DTS), a microwave-based technology that can be used to bypass a local loop, is probably the simplest technology to develop, Doll said, and some firms will introduce DTS systems within the next year. But, one disadvantage of DTS is that it is more appropriate for data than voice technology.

Cellular radio, an enhancement to standard mobile telephone technology, can also be used to transmit data. The relatively easy combination of voice and data transmission, according to Doll, makes it an attractive alternative to local loops. However, the federal government has thus far only granted approval to a handful of vendors to offer such a product.

Boosting the frequency of satellites is another way of opening more communications paths for users. Satellites now operate in the 12- to 14-Ghz range. But, theoretically, satellites could be expanded to operate in the 20-Ghz and above range.

Doll explained that not only would higher frequency satellites provide users with more communications paths, the higher frequencies have an added advantage of requiring smaller and cheaper earth stations.

An Expensive Venture

The delay in launching high-frequency satellites, Doll explained, is occurring because few networks are designed to support high-frequency transmission. Since launching a satellite is an expensive and somewhat unpredictable venture, few firms are willing to invest heavily in a device that cannot be immediately used, Doll maintained.

However, over the next few years, Doll said, some hybrid satellites will be launched. These units will offer traditional frequencies plus some high frequencies.

When it comes to processors, it can take about 15 years to get "around the corner." Josephson Junction, optoelectronic and biochip technologies have all been touted as the basis of tomorrow's processors, but none of those technologies have been sufficiently developed to allow serious testing, much less development of end-user products.

For the interim, analysts feel the next generation of processors will involve an integration of smaller processors dedicated to making a variety of features convenient and easy to use. Some researchers believe tomorrow's processors will become more specialized, employing hardware features that allow them to accomplish specific tasks.

Currently, many processors are designed to be blank slates, which are then customized by users with specific systems software and applications. In any case, processor advancements tend to hinge on advances in chip technology, which themselves are still in the development stages. ■

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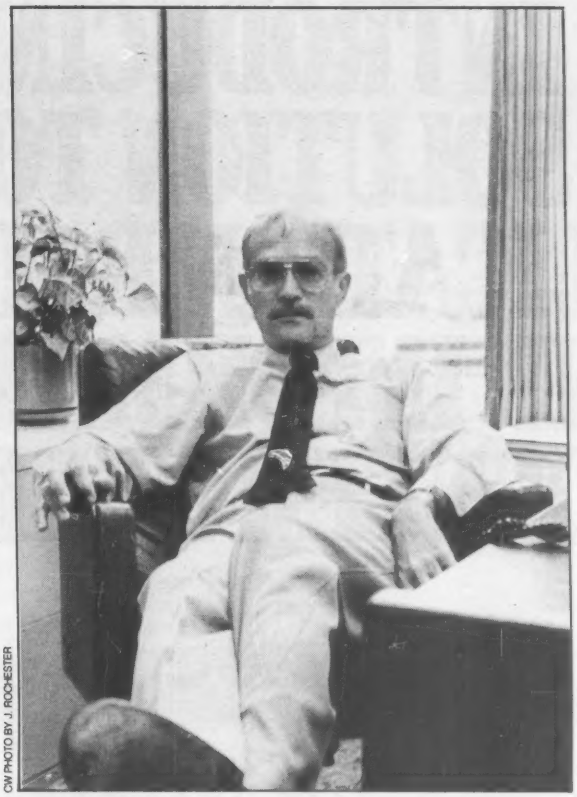

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A Conversation With Hank Koehn

A Glimpse At the Future

By Jack B. Rochester

Hank Koehn's first computer job was wiring control panels for IBM 604, 407 and 602A processors in 1952. He went on to a variety of jobs that eventually brought him the title of DP manager — including one for a New Jersey lamp company that was throwing out its DP equipment and reconverting to a manual system. The assignments provided an unorthodox beginning for the career of a man who now bears the title of vice-president of futures research at Security Pacific Bank in Los Angeles.

Koehn's work has always been at the center of the conflict between man and technology. Before he started hard-wiring control panels, he studied behavioral science at Rutgers University and The New School in New York. He joined Security Pacific 14 years ago as a technical "systems person" and spent his time as an interpreter between end users and the DP department.

When Security Pacific executives determined — much to their surprise — that the future of banking is not *technology-driven, they began to look for someone with an unlimited world view to examine the signals of change. Hank Koehn — systems analyst, DP manager, social scientist and futurist — was their choice.*

"The traditional DP department won't survive the '80s because of the diffusion of technology," Hank Koehn believes. "It can't possibly survive due to what I term the three Cs — continuity, choice and change."

Koehn explained that "through the end of World War II, the U.S. was an industrial and manufacturing nation, then we started to move into the service era. By 1948, 48% of the work force was in some service occupation — teaching, banking, medicine, insurance.

"Three great inventions that have inexorably altered our culture are the automobile, the pill and video technology. We are now in a postliterate society where people prefer visual information. We have information delivery systems mating with video technology and computers to process data that is often gathered remotely by sensors, autos that let us travel freely, birth control that allows us to explore alternate lifestyles and information technology that allows our minds to go anywhere. We see not only change, but *choice*."

Moreover, the futurist said, "Today

(Continued on Page 86)

Jack B. Rochester is the editor of Computerworld Extra!

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New York, NY	February 24
New York, NY	March 24
Norfolk, VA	January 25
Oklahoma City, OK	March 8
Omaha, NE	January 5
Omaha, NE	March 23
Orlando, FL	February 24
Ottawa, ONT	January 27
Parsippany, NJ	March 18
Philadelphia, PA	February 3
Phoenix, AZ	January 26
Pittsburgh, PA	February 22
Portland, ME	March 8
Portland, OR	March 15
Portsmouth, NH	February 23
Providence, RI	March 22
Quebec City, QUE	March 22
Raleigh, NC	February 9
Regina, SASK	February 16
Richmond, VA	January 19
Roanoke, VA	February 23
Rochester, NY	March 8
Rye, NY	February 24
Sacramento, CA	February 1
St. John, NB	February 16
St. Louis, MO	February 24
St. Paul, MN	March 2
Salt Lake City, UT	March 17
San Antonio, TX	February 22
San Diego, CA	February 23
San Francisco, CA	January 18
San Jose, CA	March 1
Savannah, GA	February 8
Seattle, WA	January 25
Shreveport, LA	March 10
Somerset, NJ	February 15
South Bend, IN	January 27
Springfield, MA	March 1
Springfield, MO	March 30
Stamford, CT	March 9
Syracuse, NY	February 9
Tallahassee, FL	March 1
Toronto, ONT	January 20
Toronto, ONT	March 29
Troy, MI	March 30
Tucson, AZ	March 9
Tulsa, OK	February 8
Vancouver, BC	January 19
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A Glimpse at the Future

(Continued from Page 83)

you're seeing a diffusion of all technologies in the home and in the work place."

So what should DP managers be concerned with? "Doing away with themselves," he maintained. "There are going to be no traditional DP management jobs on the planet's surface because everybody's going to have their own computer. The DP manager in the future has to be a consultant on data processing and information processing techniques. He can't be an operator or a priest of a process; he can't be running a religion and be the only one who can read and interpret the instructions."

However, there is a future "for DP managers who help people set up new systems and teach them how to use the information. We've overlooked the obvious with the computer resource: We just can't employ that many people. First of all, they're not talking to each other enough. Secondly, the half-life of their knowledge occurs in five to 7½ years. They need to be upgraded in new skills. We just can't do it.

"We've got to let people gather and process and store their own information. We've always thought we could solve our problems with a large computer uniquely tailored to our idiosyncratic way of doing business. But that fine-tuning and customizing is ego-driven, not driven by business necessity. There are thousands of Cuisinarts out there, and we all use them differently."

But with almost weekly reports telling us that personal computers, fourth-generation languages and end-user-driven computing are proliferating, aren't we moving away from centralized data processing?

"What we're doing in most of our projects today is just high-teching the existing office, which means we're forcing the workers into using equipment they don't like," Koehn said. "To me, the approach should be work, worker, work place. We invent the work place after we know what

(Continued on Page 88)

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☐ Please have a Kodak representative contact me.

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(Continued from Page 86)

the work is and what the worker is like.

"The key to office automation is so simple and so obvious that it's overlooked by technically oriented people. What's the nature of the venture? What are your services going to be, what kind of information will you need, what are you going to be doing five to 10 years out?"

Isn't this why we have information resource management, data base management systems, decision support systems?

"Fresh information is a form of power, and combining historical information into new meanings is a form of power," Koehn replied. "But historical data stored by categories or alphabetically, to me, is not a form of power. The power comes from recognizing a unique element or recombining the historical element into a unique element. Information per se is useless.

"Look at the last elections. It used to be very exciting when they started gathering data about who was going to win. Here in California, the predictions in the last 48 hours were that one candidate would be elected governor. What the systems overlooked was that in the last 48 to 72 hours, the other candidate blitzed the media with his image on TV and gained a higher recognition factor. And he won.

"Competitive edges are based more on intuition and impressions. People remember things that are unique. Those things are rarely in a data processing information storage system. Often, we don't know what to collect, so we collect everything. The next evil is we don't have any courage about what to throw away or ignore."

The three Cs — continuity, change and choice — are the elements that will help us prepare ourselves for the future, according to Koehn. "We have images even when we don't think we do. But we have an image from something of the past, which is the reason we reject the change. We have a vague image of the future that allows us to accept and shape the change.

"Here at Security, we publish an internal newsletter called 'Future Scan' where we try to bring all that together and try to interpret it. Then we share it with the rest of the staff — and that means from the grass roots to the president of the bank.

"Recently, we did a scenario called 'Pacific Rim 2010' (see story above) which was an attempt at producing a possible, highly probable, view of an alternate society.

"It's a terrible thing when you are dealing with the future," he added. "The only person who understood the era we're getting into was Marshall McLuhan. When he said the medium is the message, no one really understood him. He saw the future at a time when other people didn't realize that he had a good image of it.

"You can describe a doorway, a change, to someone, but unless you can open the door at the right time, society won't be ready to pass through it. The thing we must remember is that we are inventing our future by our own choice." ■

PACIFIC RIM 2010: One Scenario

The following 'memo' was prepared by Hank Koehn and his staff as a vision of the future, based on their work and research. It was circulated in September and quickly garnered interest from many people outside the bank — including people at the East-West Center, mentioned in the scenario. As a result, the East-West Center is planning a high-level conference in 1983 to explore ways to make Pacrim 2010 a reality.

Date: September 24, 2010.

Place: That region of our planet known as the Pacific Rim.

Fifty years ago, in the year 1960, a geologist described the Pacific Rim as a "halo of energy," referring to the volcanoes that circle the Rim. It was a narrow but perhaps appropriate description.

Today, in 2010, the energy that gives the Pacific Rim its cohesiveness and vibrancy flows not from molten rock and steam, but from the presence of a vast, powerful and interconnected economic and cultural community containing 4.5 billion people — over half the global population.

Technological advances in communications and transportation — especially in the years between 1990 and 2005 — have reduced the barriers of time and distance within the Pacific Rim region and made possible the lively and profitable exchange of ideas and commodities that today so profoundly shape our lives.

The Los Angeles Metroplex is the center of the Rim's financial community, functioning as an electronic nerve center for a multitude of transnational services — electronic funds transfer, trade finance, currency risk management, global funds management. L.A. Metroplex's 11-year-old offshore banking facility is now housed in the newly erected Chinatown Financial Center.

The enthusiastic support and widespread participation by so many Pacific Rim countries in the activities of the University of Hawaii's East-West Center, which has emerged as the Pacific Rim's clearinghouse, led in 1993 to the establishment of the Pacific Rim Transnational Community (PRTC). The first project of the PRTC was the financing and launching of the Pacrim I satellite, whose capabilities included:

- Multinational/multiterminal user transparency.
- Full transmission encryption protection services.
- Value-added services for small users.
- Wideband digital services.
- Video teleconferencing.
- High-speed data and facsimile transmission and electronic mail.
- Individuals-in-transit services.
- Circuit and packet-switched data-based access.
- Store-and-forward service.

Pacrim II was launched by the Japan Space Transport Authority in 1999.

The Pacific Rim Transnational Community executive conferences are routinely conducted via the Pacrim satellite, whose facilities are based at the East-West Center in Honolulu. A recent article in the multilingual *Trans Pacific Times* stated, quite accurately, that the center had become the Rim's philosophical and cultural home. But if the Rim's heart is in Hawaii, one would have to say its mind resides in the vast data banks of the L.A. Metroplex. These computer software systems, which offer everything from crisis management and political risk analysis to currency forecasting and macroeconomic modeling, are instantly accessible to any and all of the Pacrim governments.

The issue of transborder data flow regulation was resolved five years ago in 2005, with the decision to have unrestricted flow of all electronic business data across the region's national borders.

The citizen of the Pacific Rim possesses a consciousness of community that has been shaped by technology, trade and history. An openness to new ideas, coupled with the richness and diversity of the natural and human resources of the Rim, has given them, in the year 2010, a regional neighborhood second to none. ■

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EDITORIAL

Roll the Dice

Forecasting the future is one huge gamble, and we take this opportunity at the end of each year to place our bets.

The editorial staff of *Computerworld* has devoted weeks to researching and writing the stories in this Forecast '83 issue. Our objective has been not to predict specific events, but only to suggest the forces that are likely to shape the computer industry and affect data processing management next year.

Many of those forces are economic. For example, the recession in the U.S. is lingering and will clearly influence corporate operations and DP decisions next year. While inflation and interest rates are down, the federal deficit, unemployment and business failures are at post-Depression highs. Some economists see no upturn until 1984, an election year.

But the recession is worldwide, and as we are inextricably linked to the rest of the world economically, so we are joined technologically. Networks bounce data around the globe, technological developments no longer are confined to a single country and applications of computer technology can be found in almost every country. Computer technology is becoming a new form of international currency — it is bought, sold, traded, even stolen. The technological fabric is international and interdependent, and we have become one computer world.

From this perspective, 1983 promises to be an eventful year. Many will watch the two bellwethers — IBM and AT&T — which, free of government shackles, are reorganizing and taking a more aggressive posture in the worldwide computing and communications marketplaces. Together, they will set much of the tone of our industry next year.

Individual DP departments will be affected by the actions of those two companies, but they will also feel other strong winds of change. Chief among them are end-user computing and the pervasive use of microcomputers. Many DP shops have been buffeted by these changes and successfully addressed them; those that have not cannot remain immune.

Within this issue you'll find articles that explore these and other topics. We are betting that they will be the major factors in 1983 and the ones with which all of us must contend. Roll the dice.

Flexing His Muscles

DATA PAST

Five Years Ago
Dec. 26, 1977/Jan. 2, 1978

WASHINGTON, D.C. — Equifax Services, Inc., which developed reports about the personal lives of about 20 million Americans every year, used "unfair and deceptive" practices in developing and disseminating that information, a Federal Trade Commission judge ruled here.

The information collected and sold became part of millions of computerized files used by the firm's business and government clients.

— — —

HARRISON, N.Y. — A different kind of business conference took place at the headquarters of Texaco, Inc. here. The conference was held via satellite to resolve a "typical business problem" and it included participants in Harrison and in Houston.

Ten Years Ago
Dec. 27, 1972/Jan. 3, 1973

BOSTON — "One of the first if not the first" citizens' review-type panels to oversee privacy considerations in police information systems was sworn in here by former Gov. Frances W. Sargent.

The Massachusetts Privacy and Security Council was to consider whether the state's police agencies should tie into the Federal Bureau of Investigation's Computerized Criminal History System.

— — —

WASHINGTON, D.C. — The American National Standards Institute released a proposed character set for handprinting and the public had 3½ months to comment on the proposal before it was voted on. The purpose was to avoid ambiguity.

LETTERS

Implement Basic Controls

The editorial "Computer Crime Skeletons" [CW, Nov. 29] argues that organizations suffering losses from computer-assisted crime should aggressively support the public reporting and prosecution of these thefts. That position is not novel; it is quite commonly found in all types of organizations that have not yet, or not recently, suffered major losses through fraud or embezzlement.

The argument that thieves should be punished cannot be challenged in the abstract. It is only when we encounter specific cases that we find room for the frequent exceptions against which *Computerworld* argues.

Should an organization pursue prosecution of a thief if there is no firm assurance that the prosecutor will be equally enthusiastic, if the stolen funds will not be recovered, if the resulting publicity describes a little-known system defect that costs more to fix than will, in all probability, be stolen through it without that publicity and if customers, stockholders, policyholders, voters or depositors will lose faith in the management and take retribution for the seeming management failure?

Surely, most of us agree that people who break rules should be punished, but we should not insist on the blind application of these beliefs when that application will impose a greater injustice on those already offended against.

In the case of white-collar crime, *Computerworld* is wholly without data to support its argument that increased punishment will have a deterrent effect on others.

Similarly, *Computerworld* has no basis for the contention that attempts to punish thieves using computers will in some way assist those who want to secure data and the means of processing it.

The editorial implies that somehow fewer white-collar crimes are reported if they involve computers than if they do not. There is no data to support that position. I believe it not to be true.

Many of the people responsible for the management of DP facilities have not yet taken the most basic steps to secure their data.

They do not need information provided by attempts at prosecution, as the editorial suggests. It is not the case that DP directors have protected their data against all of the problems they are aware of and now need only to hear of some more offenses and how they happened to add to their list of already-implemented security measures.

Today, many firms allow large numbers of geographically dispersed people access to their DP resources and then hold none of them specifically and individually accountable for his actions. The firms are then forced to trust in the honesty and integrity of the people who have been assured complete and continuing anonymity while they do whatever can be done from the terminals. This situation not only invites dishonesty, it unfairly exposes to suspicion honest people using the same systems.

The basic controls needed to thwart most potentially dishonest employees with access to DP resources are well known. We're better advised to implement these measures than to prosecute everybody who succumbs to temptations to which they were unnecessarily exposed.

I, too, abhor criminal conduct, but not so much that I can be persuaded to embrace blindly intuitively derived measures of unproven efficacy and fairness.

Robert H. Courtney Jr.
President
Robert Courtney, Inc.
Port Ewen, N.Y.

THE DATA CENTER/John P. Murray‡

Don't Stall Too Many 'One-Trick Ponies'

'It should be clear that those circumstances within an organization that encourage the development and maintenance of a one-trick pony — or, worse yet, a stable of one-trick ponies — do not, in the long term, benefit either the individual or the organization.'

Paul Simon, in his song, *One Trick Pony*, has produced a message that applies to some of us in the data processing profession. The song tells the story of a good, indeed a very good, though limited, talent. There are, unfortunately, any number of examples of what might be called the "one-trick pony syndrome" in data processing.

The phenomenon can be observed in a number of DP departments. Many of us are familiar with, may in fact be, someone who has fallen victim to this malady. Often, this has come about as a result of an unwillingness to take charge of circumstances, a propensity simply to drift along with events.

People who find themselves in such a situation are often referred to as "specialists." While the title may be impressive, often the result is to become locked into a very narrow, confining role.

The specialists are usually programmers or analysts who have spent considerable time working exclusively on one, or perhaps two, specific systems within the organization. Some of the common systems examples are payroll, billing, claims processing or, perhaps, general ledger.

The criteria generally associated with systems under the purview of a specialist are that they be large, often complex and, almost always, critical to the ongoing health of the organization in question.

The specialist usually possesses such intimate knowledge of both the individual programs and the entire system that he can explain, often without consulting the code, where to make changes in order to effect desired results.

High-Quality Results

No question about it, the results produced by the specialist are often of high quality!

In many instances, a complex, comprehensive system runs well, is often enhanced or modified with relative ease and the clients are, by and large, satisfied.

Questions of organizational responsibility (does the specialist work for DP or for payroll?) may arise, but these are resolved in one manner or another.

Often, the specialist ends up assigned to the management information systems (MIS) department, but reports to the manager of the department responsible for the system that the specialist maintains.

Over time, the system becomes the sole province of the specialist. No one else would, in many instances no one else could, make changes to the system without the guidance of the specialist.

Is such a situation good? Does it really benefit either the individual or the organization? The long-term answer must, of course, be "No!"

While it may well be that a person in such a position derives a reasonable amount of psychic reward and job security from such an arrangement and while the organization gains an experienced person who has mastered what may be a difficult system and who can effect changes in a very short time and in a safe fashion, there are inherent disadvantages to both the individual and the organization in any arrangement such as this one.

In such a situation, the specialist will, over time, often find that the technical world has begun to pass him by.

Often, his system, once it is up and operating correctly, will continue with the same basic technology for a considerable length of time.

While the rest of the industry has moved to new access methods, online processing and data bases, the specialist may still be working with his autocode system.

Questions Still Remain

While satisfaction can be gained, should be gained, from doing a job well, these questions still remain:

- How much satisfaction can be gained from working with dying technology?
- Where in these circumstances are the challenges, the opportunities to learn and grow?
- Is the one-trick pony cloistered in his stall, being bypassed by the industry?

The answer, more often than not, is, "Of course!"

Conversely, the organization does not gain as much from such a situation as it might be assumed.

It is correct that members of management and both MIS and the department that uses the particular system can rest somewhat more easily knowing the specialist can be counted on to perform, often with consummate skill, his one trick.

False Sense of Security

Often, however, this creates a false sense of security. Because the job is being done, the requirement for adequate backup is overlooked or put off. This can prove to be fatal.

What happens when the specialist is unavailable?

Management can be rather certain that documentation, if any exists, will not be sufficient to provide any guide to solving the current problem. It will be found that any condition that removes the specialist from direct involvement with the system will translate into difficulty.

It should be clear that those circumstances within an organization that encourage the development and maintenance of a one-trick pony — or, worse yet, a stable of one-trick ponies — do not, in the long term, benefit either the individual or the organization.

Resolution of the problem does not rest entirely with either the individual or the organization.

The specialist must recognize the existence of, and work to free himself from, the shackles (golden handcuffs) represented by his total commitment and understanding of the particular system for which he has responsibility.

The organization or, more appropriately, the management of the DP department, must work to encourage the specialist to train someone else to become familiar with the system.

The specialist must also be encouraged to seek new areas within the department where he can learn and grow; he must be helped to realize the requirement to broaden his horizons.

As this develops, one caution should be observed. If a reasonably

(Continued on Page 92)

HUMAN CONNECTION /Jack Stone‡

Warning: The Unemployment Malaise Is Just Around the Corner From DP

Isn't it wonderful being in this great business, where jobs are plentiful and long-term security abounds? Of course, all of us are aware of the difficult times that those without DP skills are having. And I don't just mean the typical factory workers, but teachers, lawyers, economists, sociologists and other professionals.

As you probably know, hiring has come to a virtual standstill around the country except for individuals with talents in short supply, namely, those in data processing and those with such distinguished specialties as hamburger tossing.

The reason, of course, is unemployment malaise, the insidious form of economic cancer that is spreading throughout business and government organizations and casting a lurid pall over prospects for growth.

Beware of the Sickness

It's not my way to be a pessimist, but this has to be said: beware of the sickness, dear reader, because it may be coming closer and closer to your home. I know this because it's just around the corner from mine.

A few months ago, a good friend, an independent consultant who probably is the best urban planner in Washington, D.C., received a phone call from his federal government customer announcing the immediate termination of his long-term contract. No notice, no reason, no settlement, no nothing.

Being used to a standard of living consistent with a $40,000 annual income (my guess), he moved with alacrity to land another contract, sending proposals all over the city. The results were a universally cold shoulder: There were no new urban development programs, or plans for any, and no end-of-fiscal-year-funding to boot. So he gave up the search until after the first of the year and decided to renovate his condo apartment instead.

Saga of a WP Firm

Then there's the saga of a small word processing services firm, a consulting client of mine, whose staff numbered 35 last January and is now at six and still going down. One who was dropped from the roster had this to say about the experience:

"I suppose we all knew the layoff was rapidly approaching, but we chose to ignore it. After all, the firm had been around for over a quarter century. I was with it for nearly four years, and I figured that, one way or another, it would bail itself out. One Friday, I walked into the office, heard the announcement, was given a final check and was handed my walking papers. I was stunned, I was angry, I was frustrated.

"For me, the mere idea of looking for a job is a wrenching experience, even though I have a marketable set of word processing skills, including manuscript editing and word processing training. At least I thought I did. Then I began contacting employment agencies that specialize in word processing.

"First off, the agency contacts were Neanderthals who hadn't the slightest idea what goes on in word processing; their capabilities were limited to the repeating of job specs. But there were plenty of jobs: entry-level word processing text-entry positions paying an absurd hourly rate of $8, well below what I was used to earning.

"I was distressed about my situation. Then I stood in my first line to wait for an unemployment check: I became really depressed.

"Luckily, a friend led me to some part-time work that, along with unemployment checks, should tide me over until I find a permanent slot.

"Don't try a layoff — you won't like it."

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

LETTERS

Far Too Kind

N. Chapman and J. Tricebock have been far, far too kind to the user community in their reader commentary "Real Users Always Must Get a Cup of Coffee" [CW, Nov. 29]. I propose to remedy that condition with the following list:

- Real Users know structured walk-throughs are really structured crucifixions of the analyst.
- Real Users always wear jackets at meetings (even when the air conditioning malfunctions).
- Real Users catch the typos in the requirements documents and list each one in their comments.
- Real Users save all major system changes until programming is almost complete.
- Real Users believe professionals don't get on terminals.
- Real Users get hands-on DP experience through Pac Man games.
- Real Users believe tape can be used as a direct access device.
- Real Users respond to analysts' questions two weeks after the spec is written.
- Real Users believe system crashes are cop-outs.
- Real Users are adept at assigning blame to the project leader.
- Real Users are even more adept at accepting the credit for the project leader's ideas.
- Real Users say they have read the system documents, then ask questions that show they haven't.
- Real Users have read *Winning Through Intimidation* — twice.

P.S. I'm tempted to become a Real User. Real Users always get promoted and the job pays very well.

Christine Joseph
Systems Analyst
Software Design Associates
Philadelphia, Pa.

Toward Professionalism

I thought we came a long way toward professionalism with the certification in data processing and, more recently, with Data Processing Management Association's code of ethics, standards of conduct and enforcement procedures.

The forgers of these representations of professionalism were apparently off the mark, according to Bill Kalafus' letter to the editor [CW, Nov. 8]. What seems to be a better representation is a Wednesday afternoon golf game, long weekends and several vacations during the year.

I assume that Kalafus is not self-employed and that he works within the field of data processing. This being the case, he can satisfy his gripe by changing jobs, his employer or he can change his profession.

J.E. Sands
Manager
Business Systems Development
Carpenter Technology Corp.
Reading, Pa.

Use the SEARCH Verb

The two instructions formulated in Ahmnad Ahmadi's letter to the editor on table search method [CW, Oct. 4] — "Have I reached the end of the table?" and "Have I found the item I am looking for?" — are facilitated by using the Cobol SEARCH verb, in conjunction with the AT END and WHEN clauses.

In addition to this, proper SEARCH usage does not require an IF check upon completion of the search procedure to determine the success of the search, as in Ahmadi's example.

Lastly, the search procedure Ahmadi describes doubles the maintenance requirement. Not only does the OCCURS clause require altering, but the IF check must be modified with each table size change.

The alteration of the OCCURS clause assumed above requires n elements in an n-size table (or n + 1 in the Ahmadi construct). This assumption eliminates a table size greater than n (or n + 1) and is consistent with Ahmadi's concern to increase production considerably.

Usage of the SEARCH verb reduces maintenance, allows for the minimal number of table entries and optimizes search time.

J.R. Schofield Jr.
Albuquerque, N.M.

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CW-12/27

The customer service software people

Limited Talent Not Beneficial

(Continued from Page 91)

good job has been done by the specialist, a strong rapport will have developed between him and members of the department that uses the system for which he has responsibility. When the clients learn that their specialist will no longer be instantly available to help solve their problems, difficulty can be expected. Both the specialist and the management of the DP department must be willing to ride out the storm.

Our industry changes too rapidly. There are simply too many challenges and too many existing opportunities to allow anyone to become locked into a narrow role.

No one should, after several years of effort, look up and find he has become a one-trick pony. Both groups involved here, individuals and DP management, must work to ensure this does not happen!

Murray is director of management information services for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 20 years of DP experience, 10 of which have been devoted to the management of data centers.

CICS Offered For Mark 3000

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) will offer IBM's CICS transaction processing monitor on its IBM-compatible Mark 3000 time-sharing service.

Geisco's teleprocessing network will allow customers to use CICS in multiple locations and in combination with data base managers such as IBM's IMS, according to a spokesman for the firm.

Geisco consultants and programmers are available for assistance in application development, the spokesman added.

The CICS service costs 80 cent/computer resource unit.

Geisco is headquartered at 401 N. Washington St., Rockville, Md. 20850.

CICS Gets Security Tool

FALLS CHURCH, Va. — Tech Products, Inc. has announced a general-purpose security system for IBM's CICS on-line monitor.

Called CICS-Protect, the package is said to provide security under any hierarchy desired. An audit trail of all security checking and attempted violations can be maintained, a spokesman said. No I/O operations are required for security checking.

The package is written in assembler and is capable of handling up to 32,000 keys. Cost ranges from $3,850 to $12,650 from Tech Products at 7700 Leesburg Pike, Falls Church, Va. 22042.

Venix-Based Tools Out For VAX-11s, PDP-11s

CAMBRIDGE, Mass. — Venturcom, Inc. has announced a series of software packages for Digital Equipment Corp. VAX-11 and PDP-11 computers as well as for microcomputers based on Intel Corp.'s 8086 microprocessor.

Venix is an enhanced version of Bell Laboratories' Unix operating system geared for scientific applications. Features include asynchronous I/O, shared data memory and semaphores and a real-time priority class. The package has multiuser, time-shared capability, a spokesman said, and includes electronic mail and virtual terminal emulation.

Application development tools on Venix include C, Fortran 77 and Pascal languages, two screen editors and a command interpreter and debugger. Multiuser support with background processing and code-mapping is featured, the spokesman said. Venix for the PDP 11/23 costs $2,400.

The company also announced a series of Venix-compatible application programs.

The Final Word is called an interactive, full-screen word processor. Windowing allows multiple documents to be edited simultaneously. Automatic tracking, highlight printing and proportional spacing are standard. An 11/23 version costs $650.

Logix is a relational data base management system that allows the user to create and edit data and query selected items using English-like syntax, the spokesman said. Logix supports six data types including text, money and duration and costs $3,500 for the 11/23 and 11/34 versions; $6,000 on 11/70s.

TEQ was designed to evaluate mathematical functions interactively. The package can evaluate differential equations, compute finite integrals, locate function zeroes and plot functions, the spokesman said. The cost is $295 for an 11/23 version.

Sigpak is a signal processing package for speech, biomedical and seismic analysis or any application involving time-series data. Waveform and Emacs screen editors are featured. Sigpak provides data structures, protocols and runtime routines, the spokesman said. The package costs $5,000 on the 11/23.

Proforms is a time and billing package for service firms. Functions include invoice preparation, accounts receivable, individual contributions and project management information reporting. An 11/23 version

(Continued on Page 94)

For OS, DOS Environments

ADR/Look Gets Major Enhancements

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced major enhancements to ADR/Look, a performance monitor for tuning, diagnosis and trend analysis of IBM OS and DOS operating system environments.

Under Release 6.2 for OS environments, the CICS monitor displays file activity for files including Vsam, non-Vsam and DL/1 data sets, a spokesman said. The release features an option to display load and entry point addresses of active modules. A new option to the control block command reports on the number of free data set control blocks in Vtoc.

Look's threshold monitor now captures additional information on system I/O. The performance analyzer had been enhanced to include the domain contention index, the current multiprogramming level and extended real memory activity for MVS/SP 1.3 users, the spokesman said.

Release 2.2 of Look for DOS/VS(E)/SSX environments reportedly includes a CICS monitor, ability to access Look from ADR's Datacom/DC teleprocessing monitor and real-time graphics. A facility called Zap allows users to modify memory on-line, the spokesman claimed. Look commands can be secured through passwords and by user identification.

The permanent license fee for Look starts at $7,000 for OS, $5,500 for DOS and $4,100 for low-end 4300 and 370 products from ADR at Rt. 206 & Orchard Road, CN-8, Princeton, N.J. 08540.

Tool Said to Simulate CP/M On DG CPUs Running AOS

BERKELEY, Calif. — Virtual Microsystems has announced a software package said to simulate Digital Research, Inc.'s CP/M operating system on Data General Corp. computers running AOS or AOS/VS.

Called The Bridge, the product loads like an application program on an Eclipse computer and builds a 56K-byte CP/M environment. Operation is similar to a personal computer, the company claimed, allowing use of all CP/M applications. The user has access to resident files on the host system and file interchange between users is provided.

The package includes utilities which allow DG users to transfer CP/M files to and from DG's AOS or AOS/VS file systems. The Bridge costs $3,500 from Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

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Composed of 28 Separate Modules

Version of 'Model' Available for Prime CPUs

NATICK, Mass. — Prime Computer, Inc. has announced that a version of Lloyd Bush and Associates' Model interactive financial modeling and decision support system is available for Prime computers.

The Prime version of Model is composed of 28 separately priced modules designed to address business applications including budgeting, manpower planning, corporate modeling, merger/acquisition studies and project scheduling, a Prime spokeswoman said.

The entry-level package, priced at $9,000, includes basic budgeting and planning and the production of pro forma statements. The package includes a What If subsystem that enables the user to evaluate various model assumptions and a read/write feature for accessing data in external files.

A report writer produces standard templates and customized reports; a trace feature performs on-line editing; and a Help facility explains commands and error messages.

Lloyd Bush and Associates is located at 156 Williams St., New York, N.Y. 10038.

Prime 'DSS' Gets Printer Graphics

EAST LANSING, Mich. — The Prime Computer, Inc. minicomputer version of Mega Systems, Inc.'s Decision Support System (DSS) now includes a printer graphics module.

The module is said to provide graphics representation of data without requiring additional specialized hardware. The module offers 14 different varieties of bar, line and pie charts.

An overlay option allows the combination of bar and line graphs within a single graph presentation, according to the vendor.

Mega DSS Graphics is available as an addition to Mega DSS for $1,000/package licensed to Prime users.

Mega can be reached at P.O. Box 151, East Lansing, Mich. 48823.

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Two Languages, DBMS Designed For C Series

CAMBRIDGE, Mass. — BBN Computer Corp. has announced two business programming languages and a data base management system (DBMS) for its Bell Laboratories' Unix-based C series of minicomputers.

Cdibol is said to be a fully compatible Unix implementation of Digital Equipment Corp.'s CTS-500 Dibol. It allows programs writen in Dibol to run without change or modification on a C machine, the vendor claimed.

A version of Microfocus, Inc.'s Level II Cobol reportedly enables the company's C machines to compile and execute programs written in Ansi '74 Cobol. The package can offload batch-oriented applications from a mainframe system and exploit time-sharing capabilities of Unix and C series systems, the vendor said.

The Informix relational DBMS system is a collection of programs used for building data base applications. The package reportedly features interactive query language report writer software.

Cdibol is priced at $3,000. The business software package, which includes Level II Cobol and Informix, costs $7,500 from BBN at 33 Moulton St., Cambridge, Mass. 02238.

'Books System' Handles Files

CARMEL, Calif. — Crescent Data Systems has announced a bookshop package that integrates various accounting systems and handles 37,000 files.

The Books System runs on Data General Corp. Nova or compatible systems and is available as a packaged configuration with a Point 4 Data Corp. Mark 5 computer.

The Books System includes inventory, cross-reference, purchasing, invoicing and sales functions as well as accounts payable, general ledger and accounts receivable. Auditors can review invoices by data and issue checks accordingly, the company claimed. The entire package was written with Point 4's Force automatic programming system.

The Books System costs $5,000 for the software alone from Crescent Data Systems at 3616 "The Barnyard," Carmel, Calif. 93923.

Venix Offered For DEC CPUs

(Continued from Page 93)

costs $1,500.

Matrix is an electronic spreadsheet system for decision support. Features include simple and complex depreciation and amortization, linear and polynomial curve fitting, risk analysis, forecasting and goal-seeking, the spokesman said. Cost is $325 on an 11/23.

The spokesman said that Zilog Corp. Z80 native C and C cross compilers are available for $150 each. Venturcom is located at 139 Main St., Cambridge, Mass. 02142.

'UCC Ten Data Dictionary' Backs IMS/VS Release 1.2

DALLAS — University Computing Company (UCC) has expanded its UCC Ten Data Dictionary/Manager to provide support for IBM's IMS/VS Release 1.2. Included is support for the data sharing feature, Message Format Service, extended attributes and support for 3375 and 3380 storage devices.

Expanded keyword facilities allow predefinition of keywords by entity, selection of entity attributes and keyword control by "side," a spokesman said. All editing and security checking have been consolidated into one module. Additional features include dynamic allocation, nonstructured entity delete option, improved copy commands, queued transaction selection and improved installation techniques, the spokesman said.

The package costs $24,000 from UCC at UCC Tower, Exchange Park, Dallas, Texas 75235.

Program Tools For 'Nonstop' Offered Free

CUPERTINO, Calif. — As part of its semiannual software release that is free to current users, Tandem Computers, Inc. has announced program development tools for Tandem Nonstop computer users.

The three tools — Inspect, Binder and Crossref — are said to provide users with a comprehensive environment for development, testing and maintenance of programs written in Cobol, Fortran, the firm's TAL language and Screen Cobol.

Inspect is a symbolic debugging tool; Binder is a linkage editor said to manage and manipulate object program files; and Crossref reportedly provides a multilingual source program cross-reference facility.

Tandem is headquartered at 19333 Vallco Pkwy., Cupertino, Calif. 95014.

Support System Cuts Audit Time

NEW YORK — Peat, Marwick, Mitchell & Co. has announced a computerized audit support system that, when fully implemented, is expected to reduce the time required to complete audits by 10% or more.

The new system is called System Evaluation Approach — Computerized Audit Support (Seacas). The early phases of the system will do many of the tasks that previously had to be done manually, the accounting firm said. The system will be used in varying degress for all clients regardless of size or industry.

Further details on the new service are available from Peat, Marwick, Mitchell & Co. at 345 Park Ave., New York, N.Y. 10154.

Productivity Tools Out for RSTS Users

FREDERICTON, N.B. — A family of programmer productivity tools for Digital Equipment Corp. RSTS users is available from Solutions Deck.

The product is called Solutions Deck and it includes preprocessors to aid in producing report, inquiry, master and transaction programs. Taking advantage of the similarities among programs of the same type, the series is said to produce greater than 90% of the code required.

Solutions Deck supports the use of DEC's Basic+2 and RMS-11 if desired, the vendor said. Introductory prices are all under $800 from the firm through P.O. Box 684, Postal Station A, Fredericton, New Brunswick, E3B 5B4, Canada.

Nonvirtual Computer Users Get Customized Graphics Applications

WASHINGTON, D.C. — Decision Resources, Inc. has announced a series of customized graphics applications for users of nonvirtual computers, including machines made by Sperry Univac, Control Data Corp., Honeywell, Inc. and Burroughs Corp.; and IBM computers running CMS and MVS.

Available custom features reportedly include a mixed-mode user interface that provides step-by-step menu access to interactive graphics, a command mode access for experienced users, a standard library of user-modifiable charts and/or maps and direct access linkages to data stored in a variety of data base management systems, the vendor said.

A spokeswoman said other features allow users to design graphics on micro- or minicomputers and transmit them to a mainframe and to develop word charts using communicating word processing equipment.

A full package that is operating system-independent includes connection to data bases, standardized chart format library, multiple Help facility and variable mode access. It costs $30,000 from the firm at 1701 K St. N.W., Third Floor, Washington, D.C. 20006.

The Evolution Of A Graphics Revolution.

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Micro Notes

Zentec Corp. has announced a Microfocus, Inc. Level II **Cobol compiler** for its Series 2000 microcomputer. The compiler is said to permit any program written in Ansi '74 Cobol to run on the Series 2000. At the same time, the company released two utilities for Level II Cobol.

The enhancement permits interactive screen-handling, line-sequential file handling and run-time specifications of external file and program names, the vendor said. Support packages include screen input and output, multikey, indexed-sequential file handling capabilities and a library of run-time subroutines.

The **Microfocus Forms-2** utility permits data entry forms to be painted on the screen, a spokesman said. The **Microfocus Animator** debugging utility displays source code and allows the programmer to flag breakpoints with a cursor.

The Cobol compiler costs $1,600, Animator costs $800 and Forms-2 costs $200 from Zentec at 2400 Walsh Ave., Santa Clara, Calif. 95050.

A data base management software package for Digital Research, Inc. CP/M-based microcomputers has been announced by New Era Technologies, Inc. **Microcomputer Information Support Tools 2.0** reportedly provides access to networking tools needed for data base management, telecommunications, word processing and remote access. The software costs $1,500 from the firm at Suite 924, 2025 Eye St. N.W., Washington, D.C. 20006.

A project management system for Radio Shack TRS-80 Models II, III and 16 and Digital Research, Inc. CP/M-based systems has been announced by Institute for Scientific Analysis, Inc.

The modularized, menu-driven **Managemint** uses the Program Evaluation and Review Technique/Critical Path Method (Pert/CPM) approach and tracks schedules, budgets and resources.

The system's files are compatible with the vendor's Super data base management system and may be coupled through Super to a number of word processors, the vendor said. The basic Pert/CPM system costs $395 from the firm through P.O. Box 7186, Wilmington, Del. 19803.

Fortex Systems Corp. has introduced a utility said to allow rapid data transfer from a Winchester hard disk to floppy disks.

Xcopy reportedly includes automatic prompting, which allows the user to continue onto another floppy disk when the previous disk is filled. Preselected files can also be copied automatically, the company claimed. The product also offers the option to obtain directories from any disk and to selectively erase, rename or copy any file chosen.

The package runs on any Digital Research, Inc. CP/M or MP/M-based system with floppy disks and Winchester capability. It costs $99 from 1935 New York Ave., Huntington Station, N.Y. 11746.

Alpha Software Corp. has introduced the **Apple-IBM Connection**, a software package designed to allow information transfer between the Apple Computer, Inc. Apple II and the IBM Personal Computer. Among its advantages is the ability to transfer spreadsheet information running on the Apple to the IBM without rekeying. It is available for $195. More information is available from the vendor at Suite 400, 6 New England Executive Park, Burlington, Mass, 01803.

Visicorp has introduced **Visilink**, a software package that allows users of the spreadsheet program, Visicalc, to transfer data to their personal computer from the world's largest private business data bank from McGraw-Hill, Inc.'s Data Resources, Inc. It is designed to allow easy access to current worldwide economic and business information in a format for immediate Visicalc analysis. It is available for $250. More information is available from the vendor at 2895 Zanker Road, San Jose, Calif. 95134.

Gregg Corp. has introduced **Mainline**, a software program for the Apple II that is said to request and pass information from remote mainframe data bases to the micro via telephone. It is designed to simplify the formatting and transfer of data. It is available for $495 from the vendor at 100 Fifth Ave., Waltham, Mass. 02181.

American Business Systems (ABS) has announced price reductions for its family of microcomputer-based financial software packages. The packages run on systems utilizing Zilog, Inc.'s Z80, Z88 and Z800; Intel Corp.'s 8086; or Motorola, Inc.'s 68000 microprocessors, running under Digital Research, Inc.'s CP/M or MP/M 80 or 86; Phase One Systems, Inc.'s Oasis; or Bell Laboratories' Unix operating systems.

The price for single-user **Financial Accounting Systems** have dropped to $200/module for binary copies. **Business Accounting Control Systems** now cost $1,500 for multiuser source plus one copy of the binary and $500 for binary alone.

ABS is located at 3 Littleton Road, Westford, Mass. 01886.

Vector Graphic, Inc. has introduced the first in a series of software applications packages that automatically creates Vector Graphic Execuplan II financial forecasting models. The **Forecasting Execumodeler** comes with over 40 templates that interact automatically, enabling the user to perform forecasting and modeling for such things as sales, inventory and project management. This product can be used on all Vector Graphic systems, according to a company spokeswoman. It sells for $295, the vendor said from 500 N. Ventu Park Road, Thousand Oaks, Calif. 91320.

A graphics software package intended for Apple Computer, Inc. Apple III users is now available from Software Publishing Corp. **PFS:Graph** can produce bar, line and pie charts for presentations and up to four graphs can be displayed on a single set of axes, the vendor said. It reportedly can also perform automatic formatting, scaling, legend labeling and pattern fill. This product costs $175. The vendor is based at 1901 Landings Drive, Mountain View, Calif. 94043.

Comcrypt is the name of a CP/M-based software package that reportedly combines computer communications with encryption and decryption capabilities. This product operates over regular telephone lines or direct wire between computers and protects against "eavesdropping" on computer communications, the vendor said. Comcrypt requires a Zilog, Inc. Z80 microcomputer using Digital Research, Inc.'s CP/M 2.0 or later and a 24-line by 80-col. terminal. It costs $250 and is available from Century Systems, Inc., Suite 11B, 12872 Valley View Ave., Garden Grove, Calif. 92645.

Business Solutions, Inc. has announced **Jack**, a four-application software package for Apple Computer, Inc. Apple II processors.

The package includes a personal filer, calculation software, word processing features and mailing label capabilities. The package allows users to create letters and reports with embedded calculations. Word processing capabilities allow the user to create formatted records. The package can also be used to produce documents that can be automatically calculated as the document is being prepared, the vendor said.

The package costs $79 and is available from the vendor through P.O. Box 341, Kings Park, N.Y. 11754

Finds Five Traits

IDC Study Looks at OA Communications

By Bruce Hoard
CW Staff

FRAMINGHAM, Mass. — There are five major characteristics common to communications in most offices, according to a recent report entitled *Communications Networks in Office Automation* from International Data Corp. (IDC). The five are:

- Multiple sources of information.
- Multiple information-carrying media.
- Full range of sender/receiver permutations.
- Both structured and ad hoc information flows in the same office.
- Frequent physical relocation of individuals.

Multiple sources of information — "Most offices rely on a wide mixture of sources for 'raw material' information," the report said. Some are external, such as trade publications and on-line data bases, while others are internal, such as department or agency files and corporate financial records.

Despite the fact that different individuals in an office are likely to make different uses of those sources, the office as a unit needs to be able to provide access to all relevant sources of information.

Multiple information-carrying media — "Not only does information come to the office from a variety of sources, but it is contained on a number of different media," the study observed.

Usually, written text and voice communications, either face to face or over the telephone are the predominant media, although graphs and numerical data must be considered. In short, the media patterns of particular users are likely to vary as significantly as the sources of information.

Sender/receiver permutations — Peers communicate with each other individually; supervisors issue instructions to groups; group inputs to a project are collected and coordinated by an individual; and meetings are held at which individuals send and receive communications to and from more than one other person.

Overall, the patterns of interaction in a given office are unlikely to change radically unless the mission of the office changes, the study noted, adding that that does not mean patterns will remain stable enough to design a rigid office communications network.

Structured and ad hoc information flows — The report noted that some office work is characterized by highly structured, routine information flows. As an example, invoices come in at one end of an accounts payable office, are matched against standard information sources such as purchase orders and shipping documents and then the checks to suppliers flow out the other end.

However, "even the most routine offices have an element of ad hoc, unstructured information flow, and even the most unstructured offices have some very routine information patterns," it continues, urging network designers to plan for exceptional network use.

Physical relocation of individuals — Large-scale office moves are not unusual and even without them, reassignments, retirements and promotions lead to frequent physical location changes within the office. Therefore, the physical configuration of an office automation network must be flexible enough to bend with and accommodate those changes.

The study goes on to say that the physical mobility of office workers is "one of the strongest arguments for the private branch exchange-based local-area network architecture, particularly in old construction, since most offices are wired for telephone service."

The 74-page report also discusses user requirements for office communications networks, architectural alternatives, communications network standards and market trends.

Communications Networks in Office Automation costs $2,500 from IDC at 5 Speen St., Framingham, Mass. 01701.

SNA-Compatible Device Line To Compete With IBM 3270s

TORRANCE, Calif. — Computer Communications, Inc. (CCI) has announced a new Systems Network Architecture (SNA)-compatible product line of controllers and communications devices designed to compete with IBM's 3270 products.

CCI's Group 8000 Communications Cluster Family includes:

- The 8274 Communications Controller, which reportedly allows transparent open interconnectivity between SNA and pre-SNA hosts and devices.
- The 8276 Remote Cluster Controller, said to replace several IBM 3271, 3274 and 3276 controller models by supporting up to 240 mixed-discipline devices.
- The 8278 Display Station, designed to offer IBM 3278 functionality when teamed with CCI's 8276/8274 controllers.
- The 8287 Printer Station, an IBM 3287 functional equivalent, which can attach directly to CCI controllers, up to 5000 ft away, or to the CCI Display Station. This product features an RS-232 serial interface at 9,600 bit/sec, impact dot matrix, bidirectional printing at 120 char./sec and a mean time between failure of 4000 hours, according to the vendor.

A typical small cluster group, consisting of one CCI 8276 controller, 4 CCI 8278 displays and one 8287 printer, would cost $14,275, the vendor said from 2610 Columbia St., Torrance, Calif. 90503.

Honeywell Unveils Interactive Unit

WALTHAM, Mass. — Honeywell, Inc. has announced its lowest priced CRT terminal.

The VIP7201 is a customer-installable and maintainable interactive terminal. Its configuration flexibility and insert/delete/erase editing features make it appropriate for use in transaction processing and document preparation environments.

The terminal offer a 12-in. nonglare phosphor display. The display is 24 lines by 80 characters.

The 96-key typewriter-style keyboard provides an Ansi 4.14 layout, a calculator-style key pad and seven dual-function keys that can be used in conjuction with the host operating system.

Priced at $795, the VIP7201 is available from Honeywell, 200 Smith St., Waltham, Mass. 02154.

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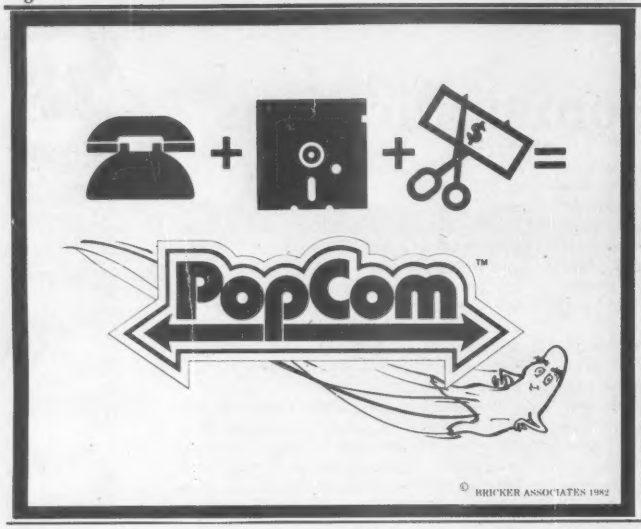

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IRVINE — Art Shields, Jill Dondel, Suite 244, 18004 Skypark Circle, Irvine, CA 92714, (714) 754-0187

Package Links IBM 3270 With External Data Bases

LOS ANGELES — Trax has introduced a communications software package that is said to let IBM 3270 CRT terminals dial out to external data bases such as the Dow Jones and Co. News/Retrieval and and the Source Telecomputing Corp.'s The Source.

The Terminal Simulation Facility (TSF) links IBM VM systems to IBM or non-IBM communications networks. TSF makes the 3270 terminal appear to be a standard Ascii terminal, providing access to a range of on-line data bases.

It may also be used as a link between IBM mainframes and other computers in the organization. This eliminates the need for separate terminals for the two systems.

TSF runs under any IBM VM operating system and uses a 3705 communications controller or equivalent. It requires no hardware or software modifications to the host system, the vendor spokesman said.

The monthly license fee of $150 to $220 includes maintenance and is available from Trax, 8948 W. 24th St., Los Angeles, Calif. 90034.

IBM 3278, 3287 Get Controller

SALT LAKE CITY, Utah — Beehive International, Inc. has announced an asynchronous cluster controller for use on IBM multipoint, multistation terminal/printer data networks.

The CC76-4 Cluster Controller is said to be comparable with IBM's 7426 Protocol Converter, but also supports bisynchronous protocol as well as Systems Network Architecture/Synchronous Data Link Control for an identical price.

The four-port controller is plug-compatible with IBM 3278 display stations and 3287 printers and their emulators. The unit costs $3,995 from 4910 Amelia Earhart Drive, Salt Lake City, Utah 84125.

System/34, 38 Get Packages

WALTHAM, Mass. — Orion Software, Inc. has announced two additions to its product line of office automation and communications software for IBM systems.

Telex/34 was designed to enable the IBM System/34 user to create, store, transmit, receive and distribute Telex I and Telex II messages with any Telex carrier permitting direct binary synchronous communications (BSC) with their networks. By using the Direct Distance Dialing connection with a synchronous modem, users can transmit BSC 2780/3780 protocol-based messages to the Telex carriers' store-and-forward facility where they are converted into the asynchronous format required by domestic and international networks, the vendor claimed. Telex/34 does not require a hardware protocol converter.

Network Orion allows multisite users of System/34s and 38s to establish a controlled and managed network of computer resources. Each site in the network has its own Network Profile that defines its relationship to other sites. A central site facility can have a Network Profile that puts it in communication with all other sites, while remote sites may be restricted in communications to the central site. Users can establish any network architecture that matches their operational requirements.

Telex/34 and Network Orion are available for $3,500 and $10,500, respectively, from the vendor at Suite 200, 400-2 Totten Pond Road, Waltham, Mass. 02154.

IBM Cuts Prices, Offers Discounts On 3380, 3880s

RYE, N.Y. — IBM announced that it has cut purchase prices on its top-of-the-line 2G-byte 3380 disk drives and accompanying 3880 disk controllers by 15%.

In addition, the firm announced a volume discount program for the 3380 and 3880 that offers users discounts ranging between 6% and 12%.

The company did not have good news, however, for those who want to lease or rent IBM's biggest disk products on short-term arrangements. Rent and lease prices were raised 15%.

IBM also announced that long-term leases on the 3380 and 3880 are now available through IBM Credit Corp.

As examples of the price changes, a 3380 AA4 disk drive that formerly cost $116,050 is now priced at $98,640. The same unit leased for $2,645 per month; it now leases for $3,075 per month on a two-year plan.

A 3380 Model B4 that cost $84,240 carries a $71,600 price tag. The unit, which leased for $1,940 per month, leases for $2,230 on a two-year plan.

The 3880 Models 1, 2 and 3, formerly priced at $78,790, now cost $66,970. They formerly leased for $2,000 per month and now lease for $2,300 on a two-year plan.

Maintenance prices on all the affected machines remain unchanged.

Analysts said the pricing moves may be an effort by IBM to bring 3380 and 3880 prices in line with pricing structures recently announced by several plug-compatible vendors. The move is also consistent with IBM's long-standing effort to make it more attractive for users to purchase rather than lease IBM hardware.

The 3380 price changes complete a price revision on IBM's big disk drives, according to International Data Corp. analyst Jack Hart. The firm announced price cuts on its second largest disk drives, the 3350 and 3375, last October, he recalled.

Two Micro-Based Units Added to Pertec Systems

IRVINE, Calif. — Pertec Computer Corp. has unveiled two microprocessor-based additions to its family of computer systems: a dual-processor business system and a system aimed at distributed processing.

Based on the Motorola, Inc. MC68000 microprocessor, the Pertec 3000 is said to be a 16/32-bit microcomputer business system that supports up to 19 terminals or printers in any combination and has over 1M byte of random-access memory and 280M bytes of storage.

This system was designed for small to medium-size businesses to handle a wide range of data processing functions simultaneously, according to the vendor. The operating system reportedly supports languages such as C compiler and Basic. The 3000 also features an 8 MHz clock frequency with the ability to implement up to 600,000 instruction/sec, the vendor said. Prices for this system start at $18,000, and it is currently available.

Also introduced was the Pertec XL50 Distributed Data Entry/Processing System, the latest addition to the XL minicomputer-class family. This machine reportedly addresses the requirements of the distributed data marketplace, utilizing Ansi Cobol, multiport communications and IBM 3270 Display System emulation.

This system provides computing capability at each workstation for true distributed data entry and processing, while providing on-site expansion capabilities as future needs arise, the vendor spokesman said.

It supports peripherals, including up to 32 standard or intelligent CRT terminals, multiple high-speed printers with spooling, multiple concurrent communications ports, an intelligent coaxial station controller and a complete range of storage media, the vendor said. This system ranges in price from $70,000 to $200,000.

This system is scheduled for early 1983 shipment. Further details are available from Pertec at 17112 Armstrong Ave., Irvine, Calif. 92714.

Mass Storage Subsystems Out For 32-Bit VAX-11 Processors

SANTA ANA, Calif. — Emulex Corp. has announced three mass storage subsystems compatible with Digital Equipment Corp.'s 32-bit VAX-11 processors.

The FXS51 Series of subsystems are available in three configurations aimed at the VAX-11/730 Unibus, VAX-11/750 Comet Memory interface bus and VAX-11/780 synchronous bus interconnect. The subsystems incorporate Emulex DEC-compatible disk and tape drives, Fujitsu, Ltd. M2351A disk drives and Control Data Corp. 92181 tape drives, the vendor spokesman said.

The three subsystems are:

• The FVS51 for the VAX-11/730 Unibus system. This subsystem incorporates an Emulex high-speed disk controller and an Emulex TC12 tape coupler. The subsystem has a storage capacity of 414M bytes and functions as a DEC RM80 subsystem.

The FVS51 costs $26,150.

• The FCS51 for the VAX-11/730. The unit contains an Emulex SC750/B series CMI bus disk controller and an Emules TC12 tape coupler. Storage capacities can range between 349M- and 414M bytes. The unit emulates two standard RP06 subsystems or one expanded RM08 subsystem.

The FCS51 costs $30,100.

• The FSS51, which emulates two standard DEC RP06 subsystems or one expanded RM80. The unit incorporates Emulex's V-Master 780/B series SBI bus disk controller and TC12 tape coupler. Storage capacity ranges from 349M to 414M bytes.

The unit costs $34,650.

Emulex is headquartered at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Tektronix Debuts Ink-Jet Printer

BEAVERTON, Ore. — An ink-jet color graphics copier said to produce eight-color copies and up to 125 definable patterns was announced by Tektronix, Inc.

The Model 4691 was designed to do simulation, design preview, stress analysis, ultrasonic scanning and surface modeling applications, according to a spokesman.

It is capable of producing B-size (297 by 432), and A-size (216 by 279) output in a horizontal or vertical format, and is fully compatible with Tektronix's 4113 Option 9 color graphics terminal and other vendor equipment depending on interfaces, a spokesman for the company said.

The stand-alone 4691 can either be used as a host connection, or as part of a local workstation. In local applications, up to four terminals can be connected, Tektronix said.

Pricing for the unit is targeted at $12,500 and will be available in the Spring of '83.

More information is available from Tektronix, Inc., P.O. Box 500, Beaverton, Oregon, 97077.

Univac 0777 Model II Performance Extended

BLUE BELL, Pa. — Sperry Univac has enhanced its 0777 Model II Laser Printer with hardware and software features that reportedly extend its performance.

The hardware features include improved effectiveness of the off-line system through the use of 6250 bit/in. group-coded recording magnetic tape, enhanced print quality with the Alternate Development Station, font expansion to 1,024 or 3,200 characters and improved printer efficiency with 2M-byte Data Transfer.

The new software includes Honeywell, Inc.'s Tape Input capability and Expanded Electronic Forms Generation.

A basic 0777 Model II configuration is priced at $378,500, the vendor said from P.O. Box 500, Blue Bell, Pa. 19424.

PE Reduces Prices To 34% on Cadam

OCEANPORT, N.J. — Perkin-Elmer Corp. has announced several product options and price reductions of up to 34% on its turnkey computer-aided design and manufacturing products.

The Cadam system, based on the company's 32-bit minicomputers, is now expandable to an eight-terminal workstation to run Cadam, Inc.'s Cadam software.

New peripheral devices for use on the Cadam system include 300- and 600 line/min. printers, a 300M-byte disk to accompany the 67M-byte disk and a dual-density high-speed tape drive to complement the existing low-speed drive, the vendor said.

Capability Unveiled

The company also unveiled a programming workstation capability that allows the user to run Fortran, Basic or assembly language programs on a time-sharing basis and perform simple text processing.

Price reductions of 13% to 34% on one to four workstation systems were also announced. A single-terminal workstation consisting of a PE 3200 Series processor, 2M bytes of memory, 67M-byte disk storage and an interactive vector-refresh graphics terminal packaged in a workstation enclosure is reduced in price from $140,000 to $160,000. Larger configurations boast price breaks up to $355,000, according to the vendor.

Perkin-Elmer's Data Systems Group is based at 2 Crescent Place, Oceanport, N.J. 07757.

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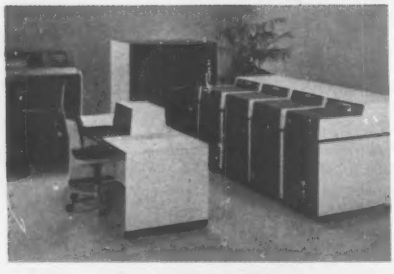

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Lower entry level — The new V-8535-II is a 32-bit processor with cycle time of 112 nanoseconds and a memory of one megabyte. It employs NCR's powerful Virtual Resource Executive (VRX) operating software.

Expanded memory — For most of the enhanced systems in the new series, potential memory is increased from 50 to 100 percent. Maximum memory now ranges from one megabyte for the V-8535-II to eight megabytes for the dyadic V-8595-II.

New dyadic systems — The NCR V-8500-II Series now includes three dyadic systems. Systems that combine symmetrical, tightly-coupled dual processors in a single cabinet. Both processors share all system resources equally with continuous dynamic load leveling.

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For more information, just call toll free (800) 543-8130 (in Ohio, 800-762-6517). Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

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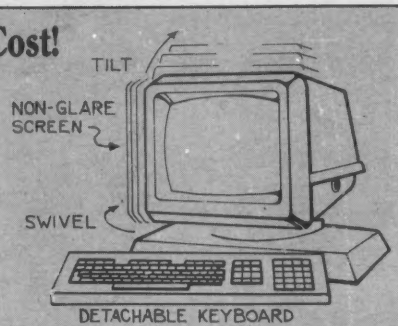

Ergonomics: MPC's terminals offer a non-glare screen, rotate 60° in either direction and compensate for height variations by tilting up to 20°. The detachable keyboard meets European DIN specifications.

The 1100 is just one of MPC's family alternatives . . . look into the MPC 1200 Series (DEC ™ VT) and the MPC 2100 Series (ISC ™ 8301).

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Compupro Unveils Dual-Micro Family

OAKLAND AIRPORT, Calif. — A family of dual-processor-based desktop microcomputers featuring 8/16-bit technology has been introduced here by Compupro Systems.

Designated the System 816 series, the product line is configured around an Intel Corp. 8085/8088 CPU and offers capabilities ranging from a single-user workstation to a high-performance multiuser system supporting users under Compupro's proprietary MP/M 8-16 operating system, according to the vendor.

The System 816 is said to be available in three models, starting with an entry-level, single-user system called System 816/A. This system includes Compupro's 8085/8088 CPU board running at 6 and 8 MHz, 128K bytes of random-access memory (RAM), four serial ports, two ports and two 8-in. floppy disk drives storing 2.4M bytes. Prices for this system begin at $5,495.

The System 816/B provides the same CPU board and software, but contains 256K bytes of RAM and six serial ports to support additional stations and more peripherals. This system costs $6,995, according to the vendor.

At the top of the line is the 816/C, which offers support for up to 16 user workstations and a wide range of mass storage peripherals. The base price for single units is $8,995.

Each of these systems features built-in clock/calendars, interrupt controllers, interval times and optional math processors. Programming languages available include assembler, Basic, Fortran, Cobol, as well as all Digital Research, Inc. CP/M-based programming languages. The vendor is located at Oakland Airport, Calif. 94614.

Compupro Systems' System 816

CA Products Bolster Naked Mini Line

IRVINE, Calif. — In a flurry of recent announcements, Computer Automation, Inc.'s Naked Mini Division unveiled seven new product offerings:

- The System III version of the Bell Laboratories Unix operating system, along with a series of packaged Naked Mini Series 5 systems. The typical low-end packaged configuration supports up to four users and consists of a Series 5 processor with memory management, 256K bytes of random-access memory, a 1M-byte floppy disk subsystem, a 10M-byte Winchester and four serial ports. Prices for this system start at $7,990.
- A 1M-byte memory board for the company's line of 16-bit superminicomputers priced at $3,990.
- A new option for its Omnix desktop computer system enabling it to run Digital Research, Inc.'s CP/M operating system. This option is reportedly available for $500.
- A local-area network that reportedly offers users low-cost communications capabilities for Omnix computers. The network uses standard telephone wire in a twisted-pair cable as the communications medium and RS-232C ports as the interface. A typical configuration would cost approximately $8,145.
- Color graphics capabilities for the Omnix computer line featuring eight colors, graphs, pie charts and various other visual formats.
- Two new disk drive configurations starting at $8,000 that reportedly provide more on-line storage to users and greater flexibility.

Computer Automation is located at 18651 Von Karman, Irvine, Calif. 92713.

Codata Announces Unix-Based Micro

LAS VEGAS — Codata Systems Corp. has announced a Motorola, Inc. 68000/Bell Laboratories Unix-based microcomputer.

The standard eight-user Codata 3300 is said to come with 320K bytes of parity-protected random-access memory, and its Intel Corp. Multibus architecture supports several different storage configurations. Backup can be accommodated through floppy disks, cartridge tape or nine-track tape drives.

Codata also announced business applications software for the Codata 3300. These are data base management system, electronic spreadsheet and word processing packages.

The standard Codata 3300 is priced at $9,600. Codata is located at 285 N. Wolfe Road, Sunnyvale, Calif. 94086.

Boasts User Flexibility

Datamac Offers 16-Bit Micro

Datamac Computer Systems' Series 1600

SUNNYVALE, Calif. — A 16-bit microcomputer offering a Zilog, Inc. Z80A microprocessor along with either an Intel Corp. 8086 or a Motorola, Inc. 68000 processor has been unveiled here by Datamac Computer Systems.

Called the Series 1600, the new system was designed to give users flexibility in configuration. In the Z80A mode, the system supports Digital Research, Inc.'s CP/M 2.2, CP/M 86, MP/M II and IBM's Mdos. In the 8086 microprocessor mode, it supports CP/M 86, MP/M 86 and IBM's MSdos. In the 68000 mode, the system supports Bell Laboratories' Unix and Phase One Systems, Inc.'s Oasis.

The system also features Intel Corp.'s Multibus, allowing configurations from a small three-card system to a large seven-card system, the vendor said.

Other important features include Help keys, 12 programmable function keys, CRT screen controls, an 8-MHz processor and a firmware-based Systems Activity Monitor that reportedly enables local or remote users to display and alter memory.

Prices for this system range from $3,300 to $8,000. Datamac is based at 680 Almanor Ave., Sunnyvale, Calif. 94086.

DEC Micro Enhancements Out

MAYNARD, Mass. — In a recent announcement, Digital Equipment Corp. unveiled several new software and hardware enhancements for its Professional 300 series line of personal microcomputers.

The software offerings include a word processing system ($295) as well as IBM communications capabilities featuring bisynchronous and Systems Network Architecture-compatible emulators ($595). Also announced from the vendor were Professional Tool Kit versions of Cobol, Dibol and Pascal software languages, priced at $2,300.

The hardware enhancements for the personal computers include a Digital Research, Inc. CP/M option that reportedly allows the small system to run CP/M-based software ($695).

Also announced were an upgrade kit for the firm's Professional 325 to 350 computers, which is priced at $2,300, and a 256K-byte memory add-on option that allows the system to reach a maximum of 1M byte of memory ($795), the vendor spokesman reported.

DEC is headquartered in Maynard, Mass. 01754.

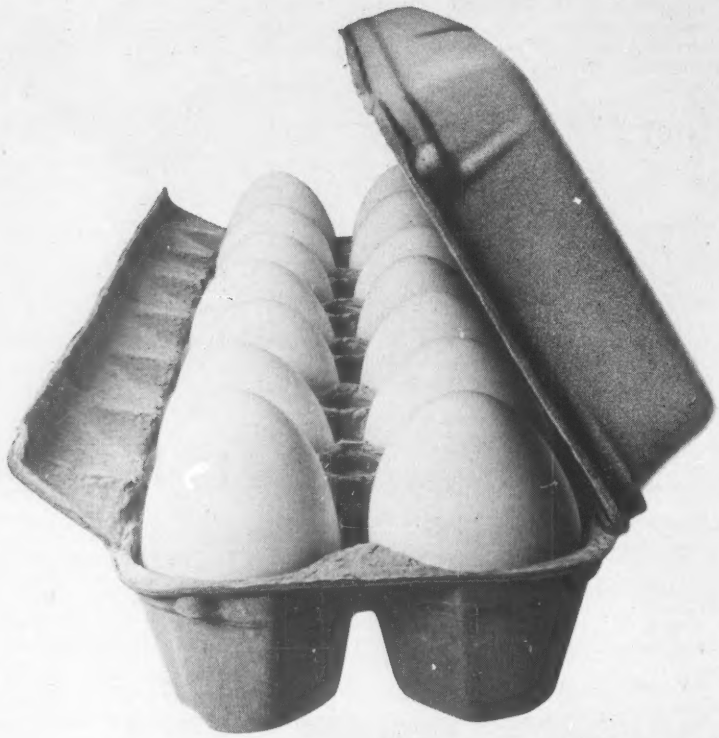
Corona Micros IBM-Compatible

WESTLAKE VILLAGE, Calif. — Corona Data Systems, Inc. has unveiled the first members of an IBM Personal Computer-compatible family of computers.

Called the Corona PC and the Portable PC, these systems feature a 320K-byte half-height diskette drive, a high-resolution green-phosphor monitor, 128K-byte memory, both a serial port and a parallel port and high-resolution graphics. IBM's MSdos operating system is also included.

The base price of the Corona PC is $2,595, and the Portable PC is priced at $2,395. Further details can be obtained from the vendor at Suite 110, 31324 Via Colinas, Westlake Village, Calif. 91361.

There's more to Computerworld than meets the eye.



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In Internal Information Area

IRS Said on Verge of Processing Change

By Jeffry Beeler
CW West Coast Bureau

CAMBRIDGE, Mass. — The Internal Revenue Service is on the verge of a major change in the processing of internal information, according to Ron Layel, acting chief of the IRS's office automation support branch.

At Harvard University's Program on Information Resource Policy, Layel recently told of the coming changes at the IRS in his talk titled "Managing Information Resources in an Information-Intensive Environment."

The IRS processes three types of information pertaining to taxes, Layel said: the actual tax return processing, collection and taxpayer services. These three areas require 33% of the IRS's staff.

This information then breaks down into external and internal categories. "It's the area of internal information that we've had trouble with," he said, adding, "but we're on the verge of a major change. Bringing the IRS up to date is the primary objective."

A study begun two years ago found that there was a tremendous need for information among the executives and that need was not being answered because of an outdated purchasing system. "The process had reached the degree of absurdity," Layel said. "Even for a word processing system, you had to go through three offices, including the federal bureau."

With 10 regional offices and 60 district offices, the IRS needed to develop a system by which these field offices could make some of their own purchasing decisions. The study found a need for automation planning and a redefinition of roles for the field offices. "Very little EDP decisions were made in the field offices even though they did much of the work," Layel observed.

"Auditors and tax collectors were preparing reports and interviews the same way since in the 1920's and 1930's," Layell said. "The offices were very paper-oriented."

Acting upon the study's findings, the IRS established a policy board to develop procedures for office automation and technology. "We streamlined the acquisition process," Layel said. "Local managers could make decisions on certain technical products."

Further, a three-way partnership was created among a new office automation branch, the field executives and the computer services department. "Data processing is centralized but everything else is decentralized," he noted.

Although the changes in purchasing procedures were made only two or three months ago, Layel expects an increase in information technology to take place in the field offices very quickly. Local executives can now make independent decisions that are not weighted down in red tape when implemented.

P-System Support Center Open For Displaywriter Customers

SAN DIEGO — Under an agreement between IBM and Softech Microsystems, Inc., an IBM Displaywriter at the UCSD P-System Support Center has been introduced to provide customers of Displaywriter P-Systems with technical information and support services.

Customers who receive shipment of Displaywriter P-Systems will be able to obtain technical information and support services with a single toll-free phone call to the support center, a spokesman said. Open between 6 a.m. and 5 p.m. Pacific Standard Time five days a week, the support center is manned by a staff of trained technicians and a senior diagnostician equipped to provide callers with speedy responses to their questions about the P-System data processing facilities on the Displaywriter.

This service will be provided free to all customers for the first 90 days after their purchase of the Displaywriter P-System and will be offered as a subscription service after that period, according to a vendor spokesman.

More information can be obtained from Softech Microsystems, which is located at 16885 W. Bernardo Drive, San Diego, Calif. 92127.

Word Processor Added to Cies 680s

IRVINE, Calif. — CIE Systems, Inc. has introduced the addition of a word processing system to its Cies 680 family of Motorola, Inc. 68000- and Bell Laboratories' Unix-based business computer systems.

Designated LEX/680, the word processing system reportedly is based on the LEX-11 system currently available on Digital Equipment Corp. PDP-11 and VAX-11 systems. LEX/680 is an integrated word and list processing multiuser software package designed around a single keystroke command structure. Standard features include menu prompting, full-screen editing, word wrap, automatic page breaks, automatic carriage return, text search and replace and automatic paragraph assembly, the vendor said.

Available in the first quarter 1983, LEX/680 has a list price of $1,500. For further information contact the vendor at 2515 McCabe Way, P.O. Box 16579, Irvine, Calif. 92713.

Micros Converted To Word Processors

GLASGOW, Scotland — Wolfson Microelectronics Institute (WMI), an international application consultancy based at Edinburgh University, has introduced a command keyboard that, when added to the existing keyboard, is said to convert a microcomputer into a dedicated word processor.

The Keystar module will perform this conversion on a microcomputer using Wordstar, the word processing program from Micropro International Corp. It will provide 56 of Wordstar's editing commands available on the software program to any microcomputer that has a cable connection between the keyboard and the unit.

The module was designed for engineers who use conventional micros for preparing and editing reports and which occasionally need word processing. It was also designed for educational institutions.

The keyboard is available for $280 from WMI, 120 Bothwell St., Glasgow, Scotland G2 7JP.

In Mid-1983

Apples to Talk to IBM CPUs

CUPERTINO, Calif. — Apple Computer, Inc. has announced that next year it will introduce a hardware/software interface said to allow Apple personal computers to communicate with IBM mainframe computers.

The 3270 cluster controller emulator will enable Apple computers to emulate IBM terminal functions, the vendor claimed. Apple computer users will be able to take advantage of mainframe functions such as on-line data entry, inquiry and response, electronic mail, remote data base access and program development.

The device will be available in a Systems Network Architecture/Synchronous Data Link Control version that emulates the IBM 3276 Control Unit Display Station and a binary synchronous communications version that emulates the IBM 3271 Cluster Controller.

Priced at $1,000/port, the product is scheduled to be available in mid-1983. For further information contact Apple at 20525 Mariani Ave., Cupertino, Calif. 95014.

Program Boasts Spaced Printing

NEW YORK — Lifeboat Associates has introduced a software program that reportedly brings true proportionally spaced printing to any microcomputer with a Digital Research, Inc. CP/M (R)-80-compatible system and a daisywheel printer.

Magicprint offers four modes of printing, true proportional spacing — justified and unjustified — and nonproportional spacing — justified and unjustified. In addition, Magicprint also underlines, overstrikes, creates bold faces, creates multicolumns and creates footnotes, the vendor said.

Magicprint is available for $195, the vendor said.. Further information can be obtained from Lifeboat Associates, which is located at 1651 Third Ave., New York, N.Y. 10028.

Ethernet Handbook Out for Users, Analysts

SAN FRANCISCO — Shotwell & Associates, Inc. is offering "The Ethernet Handbook."

The book includes products from more than 40 vendors and is designed to be useful for Ethernet users, industry analysts, and Ethernet product manufacturers.

The 408-page book costs $125 from Shotwell & Associates at Suite 481, 680 Beach St., San Francisco, Calif. 94109.

To Telex, TWX, Bell Systems

Typewriters Offered Net Access

MOUNTAIN VIEW, Calif. — Chat Communications and Systel Computers, Inc. of San Jose, Calif., have jointly introduced plug-compatible accessories for electronic typewriters that will offer word processing and the ability to access automatically the telex, TWX and Bell systems networks, worldwide.

The Systel II consists of a 12-in. CRT terminal and a disk drive that connects directly to the electronic typewriter. The Chat II connects the Systel II to a printer and/or national and international networks. The system allows businesses to upgrade familiar existing office equipment, the vendor said.

The system is available for approximately $5,000. More information is available from Chat Communications, 2438 Wyandotte St., Mountain View, Calif. 94043.

WP Daisywriter Features 25-Line Screen Display

LOS ANGELES — Computers International, Inc. has introduced a word processing system that is said to feature a 25-line screen display and 56K bytes of random-access memory.

Included in the Daisywriter system is a keyboard, a 12-in. display and the Daisywriter letter-quality printer. The keyboard has a standard typewriter-style design with a numeric key pad, a Help menu and a number of labeled function keys, the vendor said.

The function keys include margin justification, proportional spacing, automatic centering, underline, boldface and shadow print. Also included in the function keys are subscript/superscript, reprint/clear document, screen/paper scrolling, forward/reverse and typewriter/word processor.

The system is available for $1,995, Computers International said from 3540 Wilshire Blvd., Los Angeles, Calif. 90010.

WP Document Index Runs on Wang VS

AURORA, Colo. — GPB Consulting has introduced a word processing document indexing package that is said to run on all members of the Wang Laboratories, Inc. family of VS computers.

Kwic-Search is an automated keyword-in-context indexing system that is claimed to create the keyword index automatically. The operator enters a word or group of words, and the system responds with a list of documents containing the requested information.

Kwic-Search reportedly revises the index, adding references to new documents, deleting references to documents removed from the system and updating the index with changes made to revised documents.

Kwic-Search is available for $2,000 from GPB Consulting, 17957 E. Florida Drive, Aurora, Colo. 80017.

Magna Enhancement Out

CHICAGO — A.B. Dick Co. announced a software enhancement for its Magna III and Magna-Writer information processing systems designed to streamline operator functions.

Keystroke Commander allows both systems to memorize repetitious tasks for single-keystroke instructions.

It costs $450 from the firm at 5700 W. Touhy Ave., Chicago, Ill. 60648.

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December 17, 1982

O.P.M. Founders Sentenced In Fraud Case

By Bill Laberis
CW Staff

NEW YORK — Two brothers-in-law who engineered one of the largest computer business frauds in history while building O.P.M. Leasing Services, Inc. into a darling of the investment community are going to jail.

A federal judge last week sentenced Myron S. Goodman, 36, to 12 years in prison and his business partner, Mordecai S. Weissman, 35, to 10 years on charges of fraud and conspiracy. Each pleaded guilty to the charges one year ago. Each will also be eligible for parole after serving one-third of his sentence.

The sentences, handed down with stern reproachments by U.S. District Court Judge Charles S. Haight Jr., added another chapter to a sordid tale of deceit that began 10 years ago and ended in early 1981. In total, the leasing scheme fabricated by the pair bilked various investors, including pension funds, of more than $200 million, causing their customers another $100 million in losses, Judge Haight noted.

A federal memorandum detailing the fraud showed the scheme reached a high point from 1978 to 1981, when

(Continued on Page 116)

Motorola Edges TI; Japan Flexing Muscle: Report

By Bill Laberis
CW Staff

SCOTTSDALE, Ariz. — Motorola, Inc. has edged ahead of a troubled Texas Instruments, Inc. as the No. 1 semiconductor vendor, according to a recent report of the Integrated Circuit Engineering Corp.

Moreover, Japanese firms are flexing more muscle in the semiconductor arena, with Nippon Electric Co. (NEC) closing rapidly on TI for the No. 2 slot, and four Japanese companies now figuring in the top 10 manufacturer listings, the report continued.

"Status 1983 — A Report on the Integrated Circuit Industry," stated that TI remains the top overall producer of integrated circuits, but that its sales to other system manufacturers (merchant sales) fell drastically in 1982 as TI began de-emphasizing the merchant market segment. NEC, the report said, will surpass TI as a merchant semiconductor manufacturer in 1983.

Overall in 1982, circuit production by U.S. merchant suppliers increased just 4% to $6.3 billion, the report said.

"Severe price slashing, begun in late 1980 by the Japanese to keep [production] lines operating at capacity in a falling market, has continued through 1982, with average integrated circuit selling prices steadily falling by 14% over the two-year period," the report stated. "In order to cope with this situation, many U.S. and European integrated circuit houses have

(Continued on Page 110)

RANK	COMPANY	1982 SEMICONDUCTOR PRODUCTION (MILLIONS OF DOLLARS)
1	MOTOROLA	1,310
2	TI	1,227
3	NEC	1,100
4	HITACHI	800
5	NATIONAL	690
6	TOSHIBA	680
7	INTEL	610
8	PHILIPS	500
9	FUJITSU	440
10	SIGNETICS	360
TOP TEN TOTAL		$ 7,717
OTHER SEMICONDUCTOR MANUFACTURERS		$ 9,958
WORLDWIDE TOTAL		$ 17,675

Integrated Circuit Engineering Corp. Chart

Top Ten Global Semiconductor Suppliers

Threats Follow at Other Offices

Bomb Blast Damages IBM Facility

By Paul Gillin
CW Staff

HARRISON, N.Y. — A bomb blast that caused extensive damage at an IBM office building here Dec. 16 was followed by telephoned bomb threats to IBM offices in White Plains, N.Y., Manhattan and Philadelphia, forcing the evacuation of hundreds of employees. The bombed building had been evacuated only minutes before the explosion, police said.

An anonymous caller to a local newspaper group claimed responsibility for the explosion, police said. The caller indicated he was from the same group that had claimed responsibility for the bombing of a South African Airways purchasing office in Queens, N.Y., about four hours before the IBM building was hit.

The bomb went off shortly after police had evacuated the building, which had about 30 people inside prior to the explosion. The bomb was planted outside the building, police said.

The Federal Bureau of Investigation has been called in to investigate the case, "to see if there is any connection with a terrorist or radical group," according to an FBI investigator.

Bomb threats were received at two IBM offices in White Plains and at a facility in Manhattan the day after the explosion. On Monday, Dec. 20, a similar threat was phoned in to an IBM office building in Philadelphia. No bombs were found at

(Continued on Page 108)

Memorex Reduces Work Week for 750

SANTA CLARA, Calif. — Seven hundred and fifty hourly employees of Memorex Corp. will have their work weeks shortened from five to four days, or from 40 to 32 hours, beginning Jan. 10, a move provoked by the lingering recession.

The reduced work hours, affecting all production employees in Memorex's large disk drive operation, will remain in effect at least throughout the first quarter of 1983, or until volume shipments of the company's 3680 disk drives commence, a company spokesman said. The 3680, featuring thin-film storage technology, is expected to spearhead the company's recovery-propelled thrust into 1983.

All affected employees work at Memor-

(Continued on Page 112)

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Micro Maintenance to Rise 36% Annually: Study

MOUNTAIN VIEW, Calif. — Maintaining the installed base of personal computers will carry a price tag that will grow 36% per year through 1987, reaching $1.4 billion by that time, according to a recent study.

This growth, according to Input, Inc.'s "Maintenance of Personal Computers," is nearly double the growth rate for spending on all other types of computer repairs, indicating a major opportunity for third-party maintenance firms that currently dominate microcomputer service.

The report also spotlights the service strategies of major personal computer manufacturers and third-party maintenance vendors. Tandy Corp., for example, has reportedly established nationwide centers offering carry-in maintenance service.

Input claims the initial phases of the microcomputer explosion have been marked by a low priority given to service requirements, with patchwork maintenance options offered by the manufacturers and dealers.

A second phase of microcomputer development has begun, the report notes, with vendors consolidating the number of dealers and distributors handling product lines and restructuring service offerings.

However, "Vendors are spending their money on development and promotion. Few have the resources to support a full-fledged, nationwide service effort," according to Graham Kemp, study author.

"Maintenance of Personal Computers" is priced at $750 from Input, 1943 Landings Drive, Mountain View, Calif. 94043.

UK Micro Group Urges Ban on Imports

LONDON — U.S. steelmakers are not alone in their protectionist efforts to bolster sagging industry revenues by lobbying to restrict foreign imports.

A group of 22 British microcomputer companies have respectfully requested to Prime Minister Margaret Thatcher that a one-year ban be imposed upon imports of both U.S.- and Japanese-manufactured microcomputers.

The British Microcomputer Manufacturers' Group (BMMG), representing about half the UK micro makers, has also requested that the British government reassess its procurement policies in such a way to give greater preference to the procurement of UK-made over foreign-made micros and peripherals.

Businessland Opens Store

SAN JOSE, Calif. — The first of a new chain of electronic business equipment retail stores called Businessland, Inc. has opened here at 3610 Stevens Creek Blvd.

The retail centers will sell a series of small business computers from different vendors ranging in price from $2,500 to $15,000. These machines are said to perform word processing, data management, financial analysis and a variety of accounting applications.

Businessland is headquartered at 4102 Moorpark Ave., San Jose, Calif. 95117.

Bomb Damages IBM Building

(Continued from Page 107)

any of the locations and no one took responsibility for the calls, police said.

Damage estimates in the explosion were described as "extensive" by a police spokesman.

"Just about all the windows on one side of the [five-story] building were blown out," said Stephen Purdy, a sergeant at the Harrison Police Department. "Some of the metal superstructure is twisted, too."

Purdy said he felt that blast at the police station, 3½ miles from the IBM building. He said the department received inquiring phone calls from as far as five miles from the bomb site.

An anonymous caller reportedly phoned an editor at the local Gannett Westchester Newspapers office a half hour before the blast occurred at 7:35 p.m., police said. "You have 30 minutes to get everybody out. We also did the same thing to South African Airways," said the caller, who did not identify the group he represented.

The South African Airways bombing occurred at 3:45 p.m. the same day, also minutes after the building had been cleared. No injuries were reported and damage estimates were not available at press time.

The Harrison office building, which IBM leases, houses marketing and support offices for the company's National Accounts, National Marketing, Field Engineering and Customer Service Divisions. About 500 IBM people work at the building during the day, a spokesman said.

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Predicted to Reach $12 Billion by 1986

IDC: Application Terminal Market to Triple

FRAMINGHAM, Mass. — The value of the application-unique terminal market will triple to $12 billion in annual revenues by 1986, according to a report published by International Data Corp. (IDC).

The fastest growth is anticipated in the area of portable entry devices, such as those used in stores to order merchandise. IDC expects more than one million of these units will be installed by 1986.

The report, entitled "Application-Unique Terminals," identifies and defines various kinds of application-unique terminals, assesses the current and future installed base and outlines the competitive makeup of each of these markets.

The use of on-line financial terminals, including automatic teller machines (ATM), bank teller terminals and financial transaction terminals will also increase dramatically, spurred by new trends in interstate banking and the popularity of ATMs. The IDC report predicts there will be nearly six times as many ATM's installed by the end of 1986 as there were in 1981.

Other predictions include:

• Department store point-of-sale (POS) terminals will be a limited growth market, expanding at about 9% per year.

• The specialty store POS terminal market will grow at 16% per year to over 100,000 units by 1986.

• The credit authorization inquiry/response terminal market will decline because the function of these devices is already integrated into most POS terminals. The market will probably not support credit authorization terminals after 1983.

• The market for factory data collection devices will grow at an annual rate of about 29% as early models are replaced. The installed base will grow from 75,000 units at the beginning of 1982 to 215,700 by the end of 1986.

The report costs $2,500 from IDC's Corporate Planning Service Program, Five Speen St., Framir gham, Mass. 01701.

Plans to Trade ISS Division

Univac to Gain Share of MPI

BLUE BELL, Pa. — In a move designed to yield access to thin film and vertical recording technologies, Sperry Univac has inked a letter of intent to trade its Information Storage Systems (ISS) Division for a share of Magnetic Peripherals, Inc. (MPI).

At present, MPI, which makes IBM-compatible storage equipment, is owned primarily by Control Data Corp. (70%) and Honeywell, Inc. (27%). If all approvals are gained and a definitive agreement forged, Univac will become a third major partner in MPI, although its exact equity share in MPI will not be disclosed until a final agreement is signed.

According to the agreement, all 1,800 ISS employees, most of whom work in one plant in Santa Clara, Calif., would join MPI's 9,000 member work force. A Univac spokesman said no layoffs are contemplated at this time. Founded in 1969 as a maker of IBM-compatible disk drives, ISS now manufactures only Univac-compatible drives. Univac acquired ISS in 1973.

With the ISS employees and resources, MPI will continue making proprietary Univac products while researching new mass storage technologies, according to the letter of intent. ISS' top-of-the-line product, the 8840, competes with IBM's 3380, but without using thin-film technology, necessitating the packaging of four drives to achieve the 2G-byte memory capacity of one 3380.

Paul Spillane, Univac's Product Division president, said the joint agreement would allow the company to "benefit from lower product costs and sharing of overhead."

SMI, IBM, Pick Sign Agreement

ROSEMONT, Ill. — Systems Management, Inc. (SMI), IBM and Pick & Associates, Inc. have signed an agreement giving SMI worldwide rights to install the Pick operating system on the IBM Personal Computer, 4321 and 4331 computers.

SMI also announced it will install its Real-Time Processor Language and library of applications software on the integrated family of IBM computers.

The company's objective, it stated, is to provide IBM-based turnkey systems to the marketplace through a worldwide network of independent distributors, vertical market developers and direct end-user sales.

More information is available from SMI, 6300 N. River Road, Rosemont, Ill. 60018.

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Report Sees 30% Growth in Computer Services

MOUNTAIN VIEW, Calif. — The discrete manufacturing sector of the economy — the segment that manufactures products sold as units vs. bulk — will buy almost $15 billion of computer services in 1987, up from $4 billion in 1982, according to a report released by Input, Inc. The report also predicts this 30% annual growth in demand will be accompanied by major changes in the kinds of computer services demanded.

Market Opportunities in Discrete Manufacturing says the greatest growth potential for computer service vendors exists in manufacturers with fewer than 50 employees (80% of all manufacturing facilities). The resource-intensive nature of manufacturing makes it a prime area for productivity improvements through computerization, the report says.

Manufacturing will lead the demand curve for computer services with a 36% annual expansion forecast through 1987, followed by engineering and business. Growth of computer-aided engineering will lead the demand for services and applications software, the study predicts.

It presents a profile of the industry and spotlights rapidly growing markets. It analyzes user expenditures by mode of services (software, processing and professional services and integrated systems) and recommends product and marketing strategies that will fare best in the changing manufacturing environment.

The report costs $2,500 from Input at 1943 Landings Drive, Mountain View, Calif. 94043.

Software Exhibit Set for Paris

LOS ANGELES — An International Software Package Exhibition will be held in Paris in Spring 1983 in conjunction with the Convention Informatique '83.

The show will be sponsored by the Salon International de L'Informatique de la Communication et de l'Organisation du Bureau, in agreement with the Information Center for Software Package Users, with the support of the French data processing trade associations. Its purpose is to offer an overview of software available in France and abroad.

The first edition of the software exhibition will be held at the Palais des Congres, Paris, at the same time as Convention Informatique '83, which is slated for May 30 through June 3, the organizers noted.

The software exhibition is open to all French and foreign distributors of software, as well as software package and service suppliers, computer manufacturers, importers, specialty distributors and consulting firms, according to the organizers. It is being held under the auspices of the French Ministry of Foreign Trade and the Ministry of Industry.

Further information may be obtained from United Software Systems and Services Corp. at Suite 1136, 1801 Ave. of the Stars, Los Angeles, Calif. 90067.

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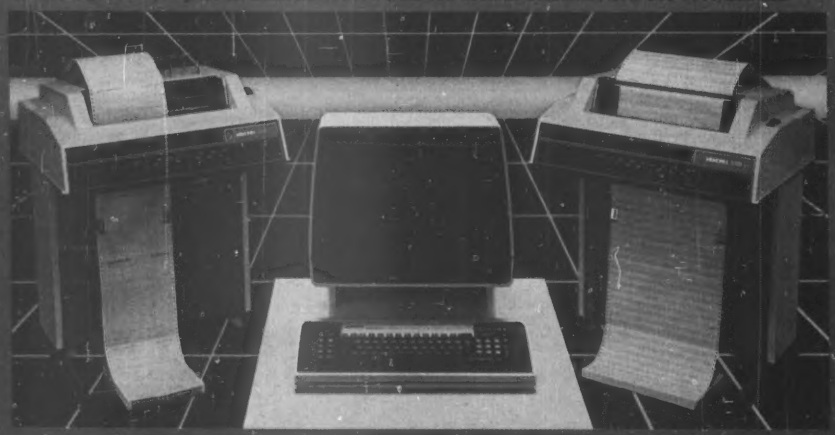

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Motorola Nips TI, Says Report

(Continued from Page 107)

increased production just to maintain sales at former levels, severely impacting profits for all parties."

The report indicated that the Japanese have further increased production to gather greater market share, with growth of 21% fueling the Japanese supply of $3.3 billion worth of integrated circuits to the world market in 1982. Of this amount, $450 million of production was exported to the U.S., surpassing Japan's imports from the U.S. by 25%.

The report predicts worldwide semiconductor growth in 1983 of 12.7%, to a total value of nearly $20 billion. Of this, production of U.S. manufacturers will be $7 billion, or 9% growth. On the other hand, the Japanese manufacturers should see semiconductor sales grow by 25% in 1983, with production of 64K-byte random-access memory chips pacing much of this anticipated growth.

The impact of the personal computer market on semiconductor sales will be significant, the report states, with Intel Corp.'s 8086/8088 family leading in implementations, followed by Motorola's M68000.

"Status 1983 — A Report on the Integrated Circuit Industry" is priced at $125 from Integrated Circuit Engineering, 15022 N. 75th St., Scottsdale, Ariz. 85260.

Prime's CEO Looks Ahead To Future Plans

By Bob Johnson
CW New York Bureau

NEW YORK — Reflecting on a 20% increase in sales in the third quarter, Joe M. Henson, Prime Computer, Inc.'s president and chief executive officer, said the company will continue to act aggressively to meet the needs of end users in the "changing corporation."

Speaking to security analysts here recently, Henson said that despite the current economic doldrums, Prime has performed well and is committed to becoming a multi-billion dollar company in a few years.

To do so, Prime will spend more on research and development and hire people with the skills to produce "full system solutions to business problems," Henson remarked.

"The new corporate user looks at data bases instead of applications. He wants data that is available to all end users regardless of their technical expertise, and Prime recognizes this as the most important aspect of its future plans," he said.

Trend Toward DDP

Addressing specific product areas that Prime will target in its expansion effort, Henson claimed there is a trend away from remote-access processing toward distributed data processing (DDP).

"Local processing will have to be addressed in the near future. Users will demand intelligent terminals and the ability to connect into a network," he said.

Users will increasingly demand system simplicity and ease of use, while system integration and reliability will continue as user requirements, Henson said. Users, he said, will want to sit at one workstation and be able to access all of the information they need.

Further, users are concerning themselves with vendor viability and market staying power, Henson said, claiming users realize the life of the vendor is more important than the life of the product. "Users know that most products have a long service life. What the buyers are now looking at is whether the vendor will be around in the long term, keeping system enhancement and integration in the future in mind."

To stay competitive and to respond to user needs, Henson said Prime will expand its product line at both the high and low end with a price/performance increase of 25% to 30% per year.

He added that Prime is striving to attain "coexistence" with the products of other vendors, claiming "connectability" looms big in Prime's future.

He said the company's product direction for 1983 will focus on an integrated approach to system development, transaction processing for the DDP market and a commitment to IBM's Systems Network Architecture communications protocol for emulation capabilities.

Prime will also seek to develop more data base management systems and user productivity tools.

Adapso Develops Position Papers for Congress

ARLINGTON, Va. — The Association of Data Processing Service Organizations, Inc. (Adapso) has developed three position papers to be delivered to the U.S. Congress and federal agencies responsible for regulating international trade.

"The Problem of International Telecommunications" outlines the differences between the domestic telecommunications policy of deregulation and private sector competition and the foreign, government-controlled and operated versions of the telecommunications industry or posts, telephones and telegraphs. It indicates that a centralized policy-making body is mandatory in order both to protect U.S. interests in matters of information flow and to eliminate barriers to trade.

The second paper, "U.S. Government Policy on International Trade in Services," outlines a purported lack of attention paid to services in U.S. trade negotiations.

The last paper, "Provision of Information Processing Services," is Adapso's plan for negotiation with foreign governments and their regulatory agencies.

The papers are intended to provide a blueprint for U.S. telecommunications and trade policies.

Copies of the papers are available from Adapso, 1300 N. 17th St., Arlington, Va. 22209.

HP Forms Division on Software

PALO ALTO, Calif. — Hewlett-Packard Co. has united four operations from its business computer and technical computer groups to form a new division designed to serve the application software needs of manufacturing companies.

Called the Manufacturing Productivity Division, the new entity will focus on producing modular, distributed and networked software for planning, scheduling, monitoring, controlling and testing applications involving materials, processes, personnel or physical facilities, the company claimed.

Gaylan I. Larson, former general manager of HP's Data Systems Division, was named general manager of the new division.

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Nickels & Dimes

Fortune Systems Corp., San Carlos, Calif., has received a $20 million line of credit from the Bank of America.

$ $ $

Management Science America, Inc. has declared a two-for-one stock split in the form of a stock dividend.

$ $ $

Quixote Corp., Chicago, has received a $4 million payment under a research and development contract from Diversified Partners, Ltd., a limited partnership sponsored by Batemen Eichler, Hill Richards, Inc. of Los Angeles. The funds will be used to complete the development of Quixote's proprietary laser-read videodisk manufacturing process.

$ $ $

SEI Corp. and **TMI Systems Corp.** have reached an agreement in principle for the acquisition of TMI by SEI. Approximately $12.5 million in SEI common stock and cash will be paid to TMI shareholders in exchange for all outstanding TMI shares, and up to an additional 64,000 shares of SEI common stock will be reserved for TMI stock options assumed by SEI.

$ $ $

Communications Satellite Corp. (Comsat) has filed a registration with the Securities and Exchange Commission covering a proposed offering of one million shares of common stock. This will be Comsat's first offering of common stock since its initial public offering in June, 1964.

$ $ $

AT&T has increased the number of shares for its common stock offering from 15 million to 16.5 million. Shares will be offered at $60 per share. The offering will be managed by Morgan Stanley & Co., Inc.; Blyth Eastman Paine Webber, Inc.; The First Boston Corp.; Merrill Lynch White Weld Capital Markets Group; and Salomon Brothers, Inc.

$ $ $

Codenoll Technology Corp., Yonkers, N.Y., has filed a registration statement with the Securities and Exchange Commission covering an offering of 450,000 shares of common stock. The offering will be managed by Allen & Co., Inc.

$ $ $

M/A-COM, Inc. has signed an eight-year, $100 million multicurrency revolving-credit and term-loan agreement with five banks, The First National Bank of Boston, Bank of America, the Chase Manahattan Bank, Citibank and Morgan Guaranty Trust Co., with the First National Bank of Boston serving as agent.

$ $ $

Maxtor Corp., Santa Clara, Calif., has completed $4 million in equity and debt funding through a venture capital group led by Bay Partners of Menlo Park, Calif.

$ $ $

Management Assistance, Inc. (MAI) has extended its option to repurchase the 1.3 million shares of MAI common stock owned by Continental Telecom, Inc. to March. 30, 1983.

$ $ $

Standard Oil of Indiana has made a direct equity investment in Numerix Corp., Newton, Mass.

$ $ $

Cullinane Database Systems, Inc. has announced a public offering of 550,000 shares of common stock at $51 per share through its underwriting group, managed by Morgan Stanley & Co., Inc. and Hambrecht & Quist. The firm has also declared a two-for-one stock split, payable on Jan. 19, 1983, to shareholders of record as of Dec. 21, 1982.

$ $ $

Cray Research, Inc. plans to file a registration statement with the Securities and Exchange Commission for a public offering of 750,000 shares of common stock.

$ $ $

Unidata Systems, Inc., of Portsmouth, N.H., has completed its first public stock offering, raising $2.5 million through the sale of 1.2 million shares.

$ $ $

Timeplex, Inc. has filed a registration statement with the Securities and Exchange Commission covering 1.1 million shares of common stock. Montgomery Securities heads up the

$ $ $

Capro, Inc., Garden Grove, Calif., has received first-round venture capital funding from a consortium comprised of First Interstate Capital, Los Angeles; Investech, New York; and United Capital Corp., Ill.

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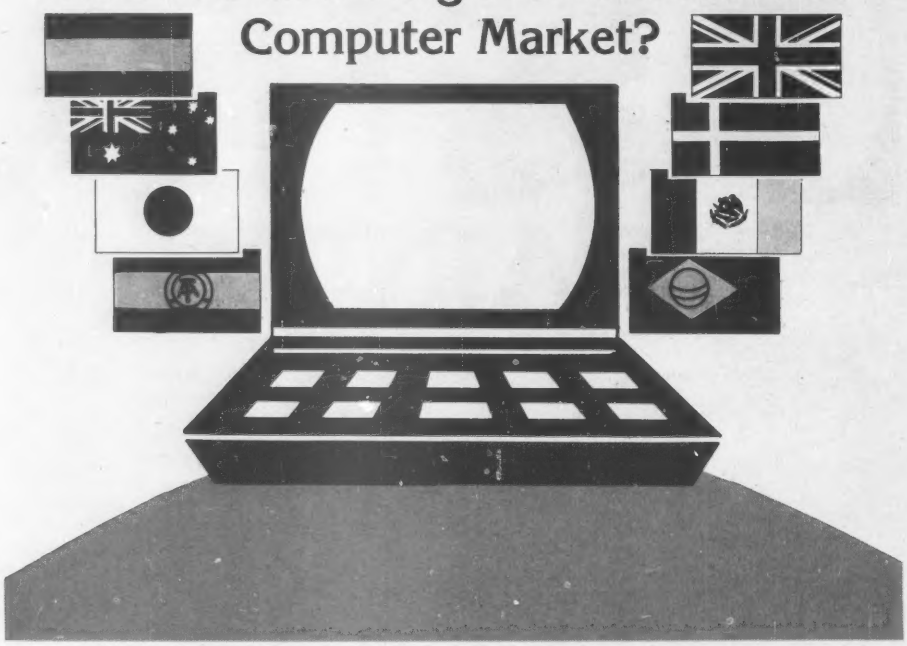

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Memorex Cuts Hours for 750

(Continued from Page 107)

ex's Santa Clara assembly plant. The company decided to reduce the hours of all employees rather than lay off a smaller number "because we want them around when things pick up next year," the spokesman said. He did not know how much the company would save as a result of the cutback.

The spokesman expressed optimism that 3680 volume shipments in the third quarter of 1983 would be heavy enough to reinstate the 40-hour work week, saying that European sales of the company's 3690 disk drive, a first-generation thin-film head subsystem, "have been super."

In a related matter, a spokesman for Burroughs Corp., which owns Memorex, said the company will impose a Burroughswide salary and hiring freeze, another move designed to combat the effects of the recession. The hiring freeze will extend down to Memorex, but not the wage freeze, because one has been in effect at Memorex throughout 1982.

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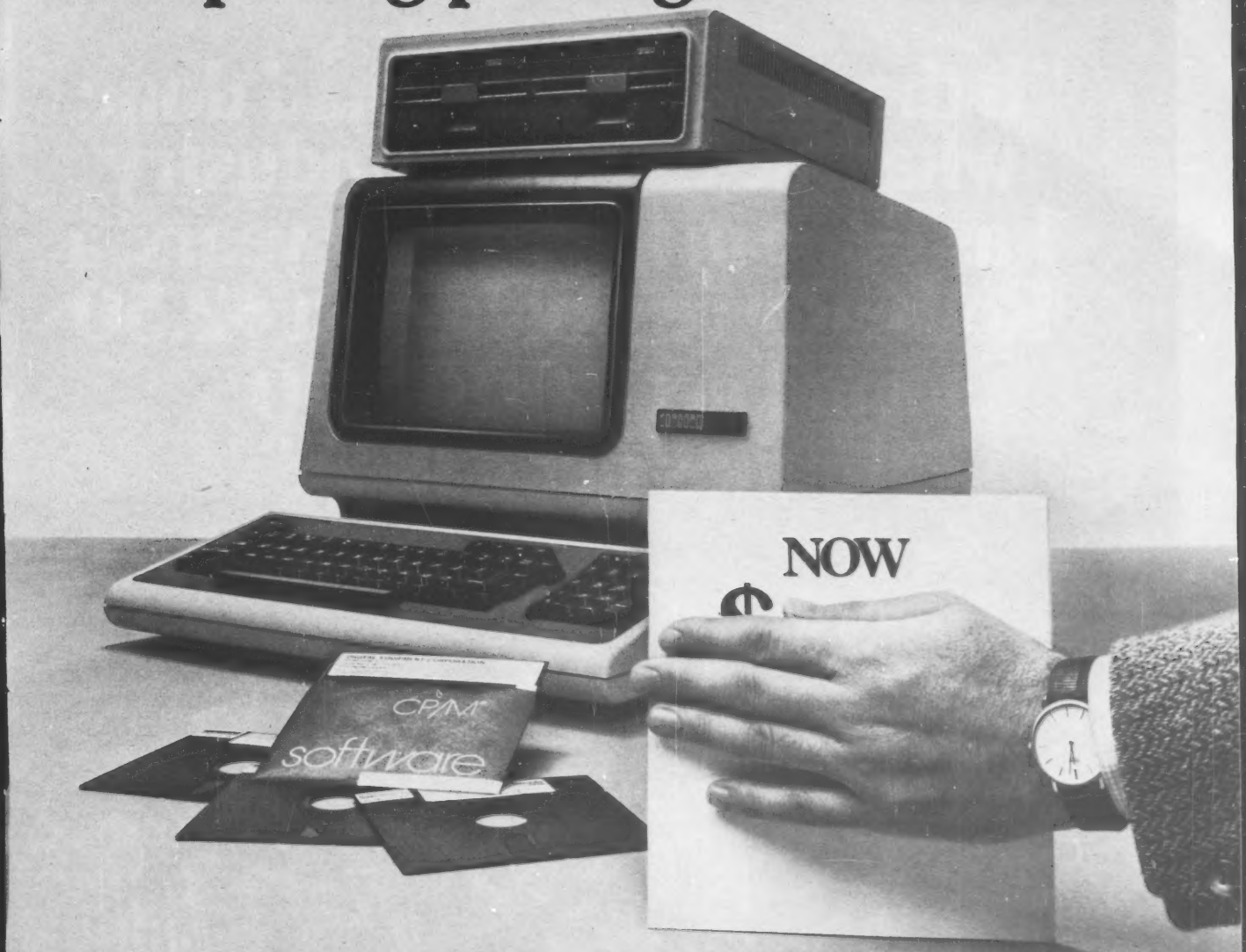

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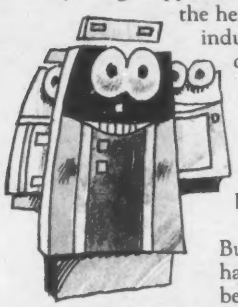
Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear). In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.



But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. In the next two years alone, installed power of general purpose computer systems will grow almost as much as it did in the previous 16 years. And the supercomputers of the 90's will transfer data at a rate several hundred times faster than even today's speedy computers! It's hard to remember this is real science, not fiction.

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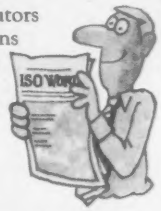

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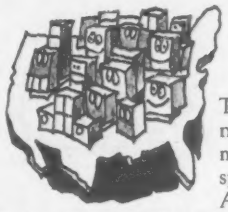

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Executive Corner

• Richard T. Newell has been promoted to vice-president, domestic operations, and William G. Walker to vice-president, finance and administration, at Inforex, Inc.

• Charles Robert Haning has been named vice-president and chief financial officer at Beehive International.

• John P. Jacobson has been appointed vice-president of western operations for Wang Laboratories, Inc.

• Robert A. Fischer has been named president of McDonnell Douglas Automation Co., the computer services division of the McDonneil Douglas Corp.

• Donald Bretmer has been named to the newly created position of vice-president, marketing services, for Advanced Micro Devices, Inc., Sunnyvale, Calif.

• Dr. Hossein Moghadam has been named vice-president, engineering, for the Peripherals Division of Pertec Computer Corp.

• William R. Leckonby has been appointed vice-president of marketing at Dialogic Systems Corp., Sunnyvale, Calif.

• Daniel Wald has been named vice-president of engineering at Direct, Inc., Santa Clara, Calif.

• Robert G. Reardon has been named vice-president of sales and marketing for STC Systems, Inc., Waldwick, N.J., a Storage Technology Corp. subsidiary.

• George Guy Zoller has been appointed vice-president of finance for Infotron Systems Corp., Cherry Hill, N.J.

• Norman L. Campbell has been promoted to assistant vice-president, information/word processing services, at Equifax, Inc., Atlanta, Ga.

• William G. Manser has been appointed vice-president of sales for IPL Systems, Inc., Waltham, Mass.

• Thomas F. Cull has been named president and chief operating officer of Interactive Systems Corp.

• R. David Guthrie has been named vice-president of sales for Local Data Co.

• Anthony Holbrook has been promoted to the new post of executive vice-president and chief operating officer at Advanced Micro Devices, Inc. Also promoted were Stephen Zelencik, senior vice-president, sales and marketing; James Downey, senior vice-president, operations; J. Philip Downing, vice-president, corporate technology; R. Clive Ghest, vice-president, product planning and applications; Curtis Francis, vice-president, strategic planning; Eugene Conner, vice-president and group executive; John East, vice-president, Bipolar Division; James Cunningham, vice-president, Advanced Technology Division; and J. David Simpson, vice-president, Information Products Division.

• Greg Pace has been appointed president of two Frank Scott Enterprises affiliates, Interactive Data Communications System and Oakland Financial Group Franchises, both of San Jose, Calif.

• James F. Megletti has been elected vice-president in charge of the Education Plus Division at Software Plus, Inc., Rutherford, N.J.

• Robert R. Bishop has been named vice-president, European operations, at Apollo Computer, Inc., Chelmsford, Mass.

• Joseph P. Ganley has been appointed vice-president, marketing, at Wabash Datatech, Inc., Rolling Meadows, Ill.

• Peter E. Cole has been promoted to vice-president, technical development, for Amnet, Inc., Watertown, Mass.

• James W. Coffey has been appointed to the newly created position of vice-president of marketing for M/A-COM Alanthus Data, Inc., an operating company of M/A-COM, Inc.

• Dennis P. Flanagan has joined Memorex Communications Group as vice-president of marketing. Memorex is a subsidiary of Burroughs Corp.

• Division presidents Thomas J. DeMaio, Network Services; Rick Duques, Brokerage Services; John Hulina, Western region; Robert J. Levenson, Mid-Atlantic region; and David J. Torrence, Dealer Services, all have been named corporate vice-presidents at Automatic Data Processing, Inc., Clinton, N.J.

• James W. Cook has joined Anacomp, Inc. as senior region vice-president of the Computer Services Group.

O.P.M. Heads Sentenced

(Continued from Page 107)

O.P.M. forged scores of phony computer leases with Rockwell International Corp. to be used as collateral to raise nearly $200 million in loan funds.

The prosecution held that the Rockwell scheme had proven a tried and tested method Goodman and Weissman had practiced throughout the '70s to secure loan proceeds. In essence, the two would either alter legitimate computer leases or create outright forgeries, at times obtaining loans from multiple investment sources for the same piece of leased equipment, prosecutors maintained.

Brushing aside pleas of mercy from lawyers of the pair, who claimed much of the proceeds of the fraud was funneled to charities in the U.S. and Israel, Judge Haight said the massive fraud approximated "a crime of violence." Goodman and Weissman were each released on $250,000 bail pending their incarceration on Jan. 12.

The sentencing memorandum noted that Goodman had implicated five other individuals in the fraud, all of whom had also pleaded guilty last year and were scheduled to be sentenced late last week. Three other men have already been convicted and sentenced for accepting bribes from O.P.M. officials.

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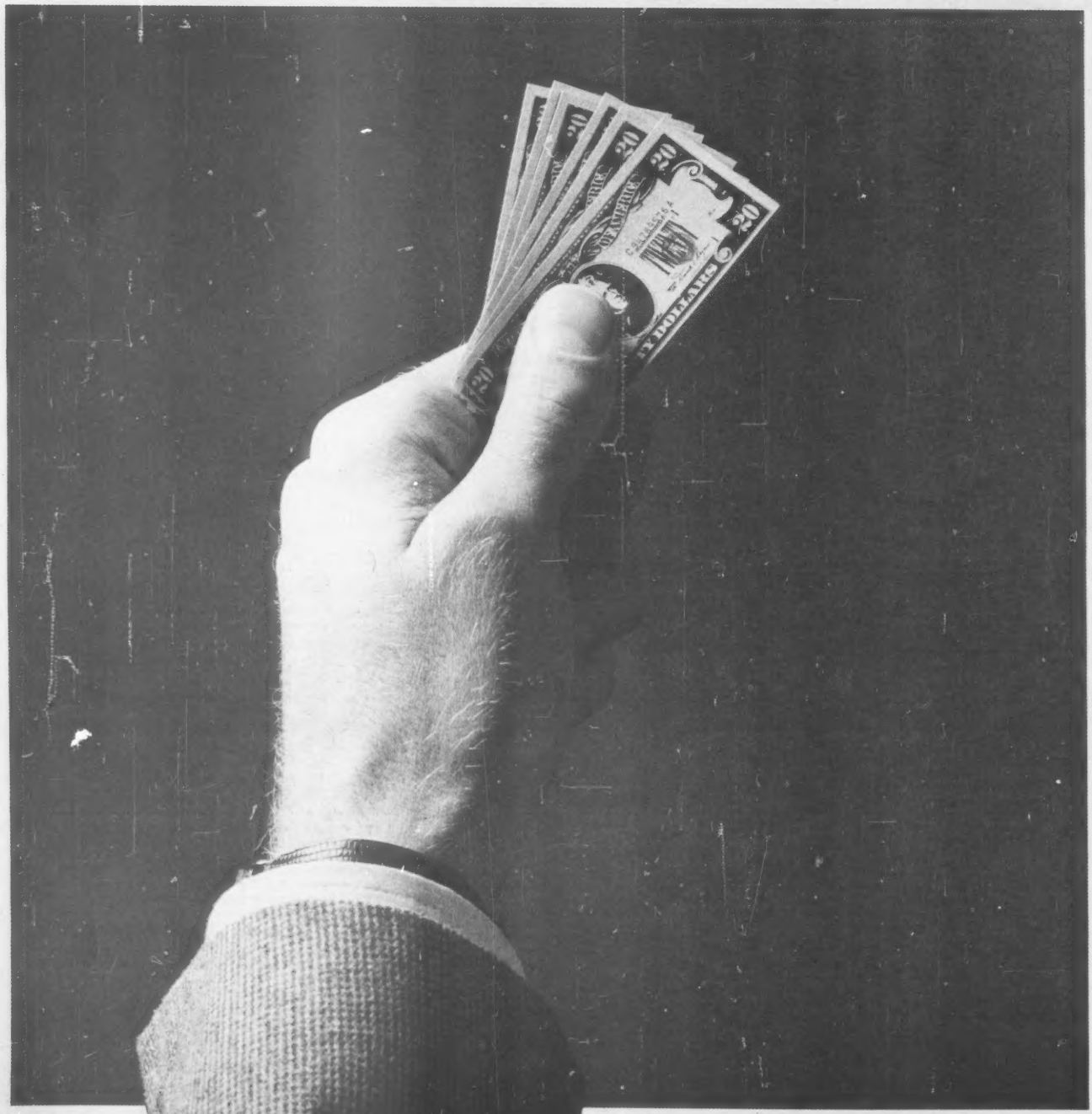

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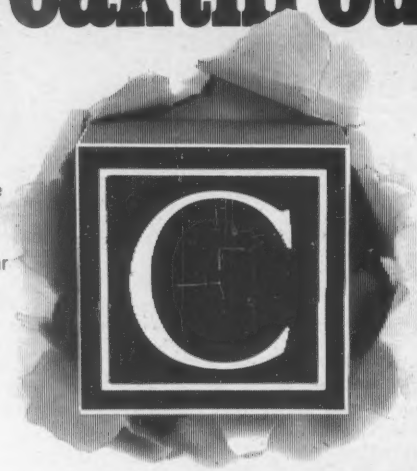

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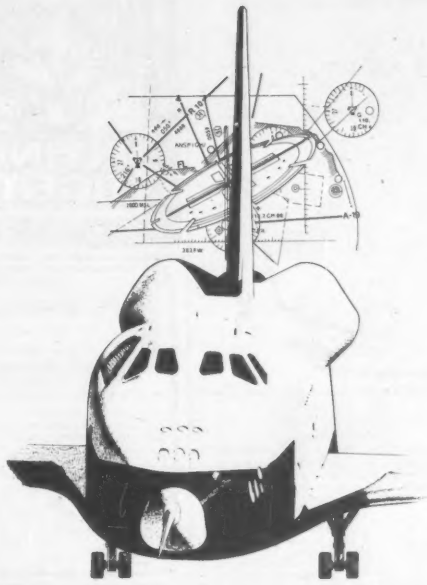

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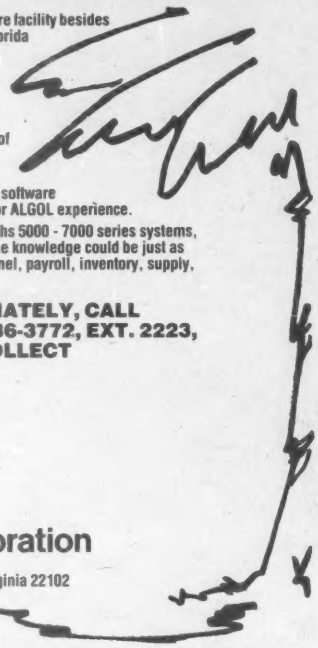

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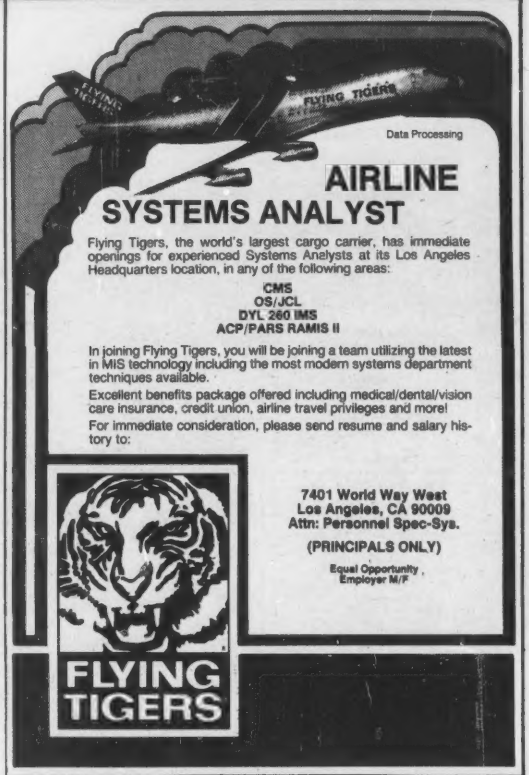

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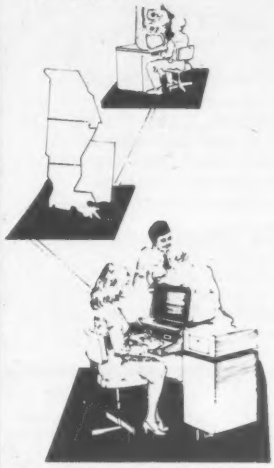

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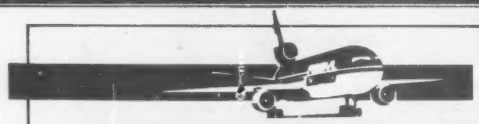

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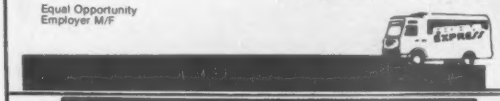

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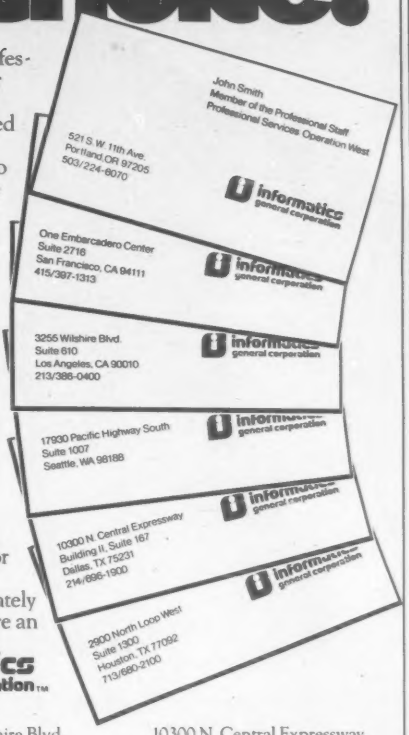

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ASC11 COBOL
DMS 1100
DDL, SDDL, DMU
DML, QLP
DPS 1100, TIP
D/B Editor

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Shop floor control, Scheduling, Manufacturing, Inventory, Purchasing, Configuration Management, Quality, Engineering.

•DATA BASE OPENINGS
Analyst, Design, Administrators with above hardware, software and applications experience.

These opportunities exist at our Michoud Assembly Facility located in suburban East New Orleans.

Qualified candidates interested in learning more about these opportunities at Martin Marietta should forward resumes, including salary history to Martin Marietta Aerospace, Denver Glazier, CW-1227, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

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Step into our fast-paced environment and work with sophisticated data systems and communications software development for a wide variety of on-line systems. Consult and plan configurations, and ensure appropriate hardware/software support for the network. You'll need a BSCS or equivalent professional experience plus three years of systems software support, a solid background in MVS, VTAM, NCP, ASSEMBLER, TSO, IMS, VM, and COBOL. A knowledge of communications protocol and good organization/planning skills are vital.

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Equal Opportunity Employer M/F

COMPUTER SYSTEMS PROGRAMMER for employment in SAUDI ARABIA. Serves with a team of U.S. advisors to Saudi Arabian National Computer Center. Requires extensive experience using MVS operating systems on IBM 370 or 30XX computers. Must be capable of installing, testing, tuning, and evaluating computers, telecommunications systems, utility packages, compilers, software packages, peripheral equipment, etc. U.S. Citizenship required. Family may accompany. Benefits include COLA, free quarters, free automobile, school allowance for dependent children, and much more.

Submit resume to: CONSULTANTS & DESIGNERS INC., 1725 Jefferson Davis Highway, Plaza Level, Arlington, VA. 22202. For more information, call toll-free (800) 368-3021. In Virginia, call (703) 521-2900.

SR. PROGRAMMER. In charge team of programmers rspnsbl for implementation of programs rltd to financial institutions. Analyze & design systems for conversion from manual procedures, as well as enhancement of existing systems to ensure efficient operation. H.S. or equiv. Must have knowledge of COBOL & ASSEMBLER. 2 yrs or 2 yrs in programming. $33,500 p.a. to work 37½ hrs/5 days/wk. **PLEASE SEND RESUMES: CAP-CPP Services, Inc. 521 Fifth Ave. NY 10175**

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Texas: $15 - $38,000

Several Texas based computer centers are expanding in 1983. In some cases mortgage differentials are being paid. Openings for IMS COBOL/ALC Programmers (10), VS1-2-MVS/CICS Systems Programmers (8) and Systems Anaysts/Project Leaders.

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Extraordinary opportunity for top notch Programmer/Analyst. Fortran, HP-3000, Image experience required. Permanent position with expanding and well established small firm offering excellent package of fringe benefits including hospitalization, major medical, paid vacations and holidays and generous pension plan. Salary based on ability and experience. **Call H. Nichols, (305) 563-9000 or send resume to: The Institute for Econometric Research, 3471 N. Federal Hwy., Fort Lauderdale, FL 33306.**

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We are currently searching for several key unique individuals. These individuals must have experience in one of the following areas:

- **Communications Software**
- **Data Base Software or Analyst/ Administration**
- **Operating Systems**

These individuals (4) should have a good idea what they want to do now and in the future. (no market browsers please). For a confidential screening conversation, call (412) 391-0236. Resumes accepted.

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To $46K

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We offer an excellent salary and benefits package, including stock option plan; company-paid major medical, life and dental insurance for you and your dependents. Please send your confidential resume, indicating salary requirements, to: **Michael Davis, Regional Sales Manager, Corvus Systems, 122 East 42nd Street, Suite 1700, New York, NY 10168. No Agencies Please.** We are an equal opportunity employer.

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We need highly motivated individuals, preferably with BS degrees and a minimum of 3 years experience in the business community. If you communicate well, have formal Development Methodology training, have DBMS education, and on-line distributive processing experience, you may be the person we need. Experience in any of the following application areas would be beneficial:

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- **Inventory/Production Control**
- **Accounting**
- **CAD/CAM**

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The successful candidate will contribute to the conversion to, and the implementation of new subsystems and configuring hardware and software. We prefer an individual with good communications skills who has 3-5 years of experience with some combination of:

- **MVS JES3 and TSO**
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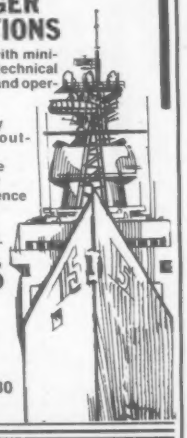

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An Equal Opportunity Employer M/F

International Opportunity for Systems Software Specialist

The King Faisal Specialist Hospital and Research Centre has an opening in its Data Processing Department for a Systems Software Specialist. The Hospital is a 250 bed acute care facility located in Riyadh, Saudi Arabia. The Systems Specialist is responsible for the technical direction of software operations which includes system development, design modification, troubleshooting, management and control of data base software.

Requirements include a BS degree (Masters preferred) in Computer Science and five years experience in systems programming, systems software design, data base management and network communications. Must have IBM DOS/VSE, CICS and DL-1 experience.

Salaries are excellent and benefits include 30 day annual vacation, transportation, furnished housing, bonus pay and more. A 24 month contract commitment is required.

Interested applicants should forward a resume with salary history to Linda Hogin, Senior International Representative Hospital Corporation of America, International Division, P.O. Box 550, Nashville, Tennessee 37202. An Equal Opportunity Employer.

HCA International Division

Assistant Director of Data Processing

District Office

Salary $2,379-2,996/Month

Duties: Plans, coordinates, implements, controls systems analysis, programming of personnel services, financial services, and student services systems; performs related work as required.

Experience: 5 years full-time systems analysis, programming, data communications, minimum 3 years which involves design, implementation of applications utilizing language of business or education environment.

Education: BA or BS (accredited college or university).

Deadline: January 27, 1983 (Office closed Dec. 24-31/82) 5 p.m.

Inquire: State Center Community College District, Personnel Commission, 1525 East Weldon, Fresno, CA 93704 Phone (209) 226-0720.

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Growing manufacturing company seeks a Programmer/Analyst/DP Manager for its' DEC Datasystem 357 (PDP 11-34 based) programmed in DIBOL.

Good working knowledge of all major DP functions in the areas of hardware and software, especially programming. Heavy emphasis on manufacturing and business applications. Knowledge of DEC equipment and DIBOL preferred.

Individual will be responsible for all DP operations, especially: modification of current software; design, development and implementation of new software; acquisition and customizing of packaged software; acquisition of hardware; and maintaining the system. We offer a challenging and informal working environment and comprehensive benefits. Salary open.

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Relevent Doctorate or ABD preferred. Appropriate Master's Degree considered. Successful teaching experience or demonstrated potential required. Teaching computer languages and systems courses. Rank and tenure status dependant upon qualifications. Salary highly competitive. ESU has over 1500 business majors including 200 Data Processing/Information Systems Majors. **Apply by February 14, 1983, to Dr. George Walters, Chairperson, Division of Business, Emporia State University, Emporia, Kansas 66801.**

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Computer Information Systems Department - has faculty openings starting September 1982, to teach undergraduate and graduate courses in Computer Information Systems and EDP Auditing. Rank and class appointment requires an appropriate doctorate or ABD. Lectureship appointments require an appropriate master's degree. Both type appointments require further qualifications which include demonstration of a sincere interest in teaching and 3-5 years' experience in either systems design, data base management, small business computers, or EDP auditing. Closing date for application is January 31, 1983. Send resume to:

Dr. W. Slater Hollis, Dean
School of Business Administration
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ROLM CORPORATION

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1 col. X 4" - $450.80
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2 cols. X 5" - $1127.00
2 cols. X 8" - $1803.20

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Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

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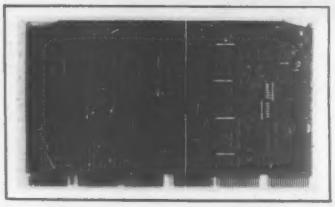

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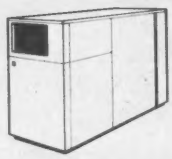

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Here's the data you need to know to place your ad:

The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue date). Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logos or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

Our ad takers will be happy to take smaller sized ads over the phone. We can provide simple line borders for you, if desired.

We also provide telecopier service at extensions 410 and 451.

The open line rate is **$8.05** per line and there is a minimum size ad of 2 column inches (28 lines) at a cost of **$225.40**. Column inches are calculated by multiplying the number of columns wide by the number of inches deep your ad is. Depth increases in half-inch increments and we accomodate up to 5 columns. Column widths are as follows:

1 column--1 13/16" or 11 picas
2 columns--3 13/16" or 23 picas
3 columns--5 13/16" or 35 picas
4 columns--7 13/16" or 47 picas
5 columns--9 13/16" or 59 picas

If you wish a box number to be assigned to your ad, it will cost an additional **$15.00.**

First-time advertisers must send payment along with their ad.

For the ***Computerworld Bulletin Board,*** ads may be sent by mail, by telecopier or given over the phone. Space is available in ***one column by one inch deep units only.*** They are set up using a ***simple format with standard typefaces and no borders or logos are allowed.*** The cost of one standard unit is ***$115.00.*** These units may be combined to form deeper ads.

So, whatever the problem, simply supply us with the data we need to help you on your way to a solution, quickly and efficiently.

If you would like more information, or wish to reserve space, call our office nearest you.

Boston - (617) 879-0700 or
1-800-343-6474
New York - (201) 967-1350
San Francisco - (415) 421-7330
Chicago - (312) 827-4433
Los Angeles - (714) 556-6480

William J. Mills, Classified Advertising Manager

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

3083-E16
4341-L11
4341-M12

WANTED
4341 Grp 1 or 2
For Outright Purchase
Or Purchase-Leaseback
Short or Long Term

Tape Drives
3420
3410 8809
Immediate Delivery

Controllers
3880 3830
3803
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3340
3330 3310
Immediate Delivery

Printers
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3262 1403
3287 3289
Immediate Delivery

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3276 3271
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Peripheral Equipment

CDLA

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7704 Seminole Ave., Philadelphia PA 19126

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Call FREE 1-800-527-6438
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MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

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SYSTEM/32 **SYSTEM/34**

If you have a System/32 or System/34 to sell, we would like to buy it. Since we are dealing on behalf of already committed buyers, we can afford to pay top dollar for your computer.

CONTACT
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National Medical Computer Services, Inc.
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San Diego Ca. 92121

Call Toll-Free
800-582-6474

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3203-5	1419-1	3340 A2

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— CPU'S —
11/23 11/34A 11/44 11/45 11/70 11/750

— DISCS —
RK05 RL01 RL02 RM02 RM03
RP04 RP05 RP06 RK06 RK07

— TAPES —
TM11EA TE16 TWE16 TJU45 TU45

— MEMORY —

11/34	11/44	11/45	11/70	VAX
MS11JP	MS11MB	MM11UP	MJ11BE	MS750
MS11LB		MF11UP	MK11BE	MS780
MS11LD			MK11CE	

— MISC. —

FP11A	FP11B	FP11C	FP11E	FP780
DMC11AL	DMC11AR	DMC11MD	DMC11DA	DMR11
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The Hottest New Newspaper in the Hottest New Computer Market!

Looking for a new market for equipment, services, software or used computers?

Thirty thousand readers of this Mexican newspaper are looking for you.

Come together at $1.90 per agate line on a 5 column page like this one (minium 30 lines/one column).

Write or call: Alicia Lavastida.
Computerworld/México Oaxaca 21-2 México 7, D.F.
Tels.: (905) 549-3139 514-3219. We'll translate your ad for $5.00/page--and set type free.

FOR SALE OR LEASE ASSIGNMENT
(1) 4341-L01
(1) 3880-001
(2) 3370-A01
(6) 3370-B01
(1) 3803-002
(3) 3420-004
(1) 3203-005
(2) 3274-D31
(1) 3540-B02
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Equipment was installed new on 12/4/81 and currently under IBM 2 yr. lease. We will sell or assign our lease to reduce our penalty! Most will be 30% accrued to ward purchase on 1/1/83.

CALL KELSEY KENNEDY
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4300's/3
S/38, S/1
Call Collect:
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DATAMARC
6065 Roswell Rd.
Atlanta, GA 30328
S/32
S/34
All IBM Peripherals

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

IBM

SERIES/1 AND PERIPHERALS

4952	4955	4973	4966
4962	4963	4974	4978

SYSTEMS/34 ALL MODELS

5211	3262	5251	5256
5110	5120	5114	5103
3340	3344	3410	3411
3776	3777	3741	3742

SYSTEM/32
029 129

Want to Buy S/34 s & Series 1's All Models

GEMINI COMPUTER CORPORATION

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Headquarters
214-934-9152
14229 Proton
Dallas, TX 75234

E. R. McDonald
West Coast Office
213-704-9725
4526 Saltillo
Woodland Hills, CA 91364

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DISK PACKS, DATA MODULES, MAG. TAPE, DISKETTES

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machines
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085—087—088— 129— 514
519—548—557—3330—3340

disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

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5633 W. Howard St. Chicago, IL 60648
800-621-3906 312-647-0880
Authorized Distributor—Memorex. CDC. 3M. BASF. Verbatim

BUSINESS OPPORTUNITIES

Wanted to Develop: Hand Held Microcomputer Summons Issuance Device for The Parking Violations Bureau.

Proposals will be received by representatives of The New York City Department of Transportation, Parking Violations Bureau, Rm. 1017, 40 Worth Street, New York, NY 10013 as follows:

Proposals will be received until 4 PM on the date specified.

Monday, February 7, 1983.

Request for proposal documents may be obtained from Mr. Donald Cirillo, Chief, Contracts/Purchase Section, Department of Transportation, Division of Fiscal Affairs, Room 1017, 40 Worth Street, New York, NY 10013, between the hours of 9 AM to 4 PM, Monday - Friday.

STATE OF CONNECTICUT
REQUEST FOR PROPOSAL
REFERENCE: R331

Vendors interested in responding to a forthcoming RFP for D. P. CONSULTING SERVICES to augment State expertise are asked to contact:

Gordon L. Partridge, Director
State of Connecticut (DAS)
Office of Resources and Facilities Planning
340 Capitol Avenue, 1st Floor
Hartford, CT 06106
(203) 566-3304
REFERENCE: R331

CLOSING DATE: Fifteen (15) days from date of this issue.

STATE OF CONNECTICUT
REQUEST FOR PROPOSAL
REFERENCE: R326

Vendors interested in responding to a forthcoming RFP for a: FISCAL MANAGEMENT INFORMATION SYSTEM at a major health center are asked to contact:

Gordon L. Partridge, Director
State of Connecticut (DAS)
Office of Resources and Facilities Planning
340 Capitol Avenue, 1st Floor
Hartford, CT 06106
(203) 566-3304
REFERENCE: R326

CLOSING DATE: Seventeen (17) days from date of this issue.

The City of Minneapolis, MN

CALL FOR PROPOSALS

Software design and development services are being sought by the City of Minneapolis, MN for a Micro-computer based street sign inventory system.
If interested contact:

Minneapolis Traffic Eng. Div.
300 Border Ave. North
Minneapolis, MN 55405
(612) 348-3811

When Opportunity Knocks...

Advertise it in COMPUTERWORLD's Business Opportunities

Call 1-800-343-6474 To Place Your Ad.

For: Design, Development and Implementation of a new information system for the Parking Violations Bureau in the City of New York.

Proposals will be received by representatives of The New York City Department of Transportation, Parking Violations Bureau, Rm. 1017, 40 Worth Street, New York, NY 10013 as follows:

Proposals will be received until 4 PM on the date specified.

Friday, February 25, 1983.

Request for proposal documents may be obtained from Mr. Donald Cirillo, Chief, Contracts/Purchase Section, Department of Transportation, Division of Fiscal Affairs, Room 1017, 40 Worth Street, New York, NY 10013, between the hours of 9 AM to 4 PM, Monday - Friday. For information contact Mr. William T. Morris at (212) 566-0598.

THE BULLETIN BOARD

A Low-Cost Way to Sell Hardware and Software in Computerworld

What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware in a convenient, low-cost format. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more that half a million Computerwold readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

Price for each standard unit is only $115. There is an one unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld. It's a simple and effective system for buying and selling hardware and software.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon below or call one of our ad-takers. (If your company has never advertised with us before we request a check with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on a six-column page in our classifed section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880
Framingham, MA 01701

617-879-0700 **800-343-6474**

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

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Pre-Owned, Reconditioned & G'teed	
2280N-1 V-1 Eq: 26-30 Mb	6.9K
2280-3 Eq: (w/dpu) Unused	13.K
2265V-1 Eq: 75Mb Disk	5.4K
2265 1/-2 Eq: 288Mb Disk	11.4K
2260-C Eq: 10Mb	3.1K
2281-P Wang Daisy	2.7K
2273-1 Eq: 300 LPM Band	3.9K
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2209-2 Eq: D.D. Tape, New	7.9K
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WANT TO BUY
SYSTEM 34's
ALL MODELS
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DATA 3 COMPUTER CORP.
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(800)328-7938

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IMMEDIATE DELIVERY
DATA EXCHANGE
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Tel.(817)268-0023

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SIGNIFICANTLY REDUCED
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For Lease
3880-1/8170
2 Year-$2150
3 Year-$1600
Several Available
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(813) 799-4310 Collect

FOR SALE
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Available Now
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Computer Merchants, Inc.

FOR SALE
USED IBM
5110 Computer 32K Basic
Diskette Unit - 2 Drives
Printer 120 CPS
Maintenance Agreement Available
Call Fred Biesecker
Appleton, Wisconsin
(414) 734-1478

IBM 5120/5110
SYS 32 SYS 34
Tubes & Printers
Available Immediately
We Also Buy **IBM** Equipment
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(617)720-1313

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5251-11's
IMMEDIATE DELIVERY
DATA EXCHANGE
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FOR SUBLEASE
64K Memory, 27MB Disk, 300 LPM Printer, (2) Displays
Minimum Term - 12 Months
MONTHLY RATE - $1250
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For Signed Orders
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2 Model C23
1 Model D24
1 Model E35
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2501 B1, 3340 A2, S/3 D26
Want to Buy (2) 3420-4
Vargo Companies
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Immediate Delivery
Computer Merchants, Inc.
914-238-9631

IBM

5120
APL/BASIC
48K CPU
120 CPS Printer
Call Ron Gibb
914-238-9631

158-U36
ISC, Madrids
Avail. Immediately
(214) 783-1212

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CRT's & Printers
5291-1, 5292-1, 5224-1 & 2
Available immediately with complete IBM systems. Call regarding our flexible lease plans.
CERES CAPITAL CORP.
(212)279-4467
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ORDER NOW:
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- All Upgrade Prices
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- Plus More.

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IBM 4331
MODEL JO2
Long or Short Term Lease
Will Replace Your JO1 With Our JO2
SAVE AT LEAST 40%
CALL NOW!!!
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MEMORY FOR IBM 168
- Immediate Availability
- For Lease Through 1/84
- Will Consider All Offers

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W/A DATALYNX/3270 ($1450) And Low Cost ASCII CRT (1 or 2) /Printer. 3276 Dialup Capability Supported.
LOCAL DATA
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(213)320-7126

FOR SALE
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192K-102M 1403
(6) 3275 (6) 3284
MAKE OFFER TO
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KSN Inc., 905 N. Main
Wichita, KS 67203

FOR SALE
SYS 32
24K-9M B33
MAKE OFFER TO
Keith Rucas, D.P. Mgr.
KSN Inc., 905 N. Main
Wichita, KS 67203

SYSTEM 34
BUY SELL LEASE
Peripherals - Features
Disk & Memory Upgrades
Call Carolynn Koucky
American Computer Exchange
(216)247-2100

More Bulletin Board on the next page.

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NCR Maint. Avail. Immed.
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Chattanooga, TN 37415
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With 4 Meg Main Memory
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(1) 647 2000 LPM Line Printer
(1) 646 1200 LPM Line Printer
(1) 6420 600 LPM Line Printer
(2) 621 Communication Multiplexors
(2) 634 Magnetic Tape Units
(1) 6780 Check Sorter - 24 Pockets
(1) 721 Comm. Front End Processor
(38) 7900 CRT Terminals
(16) 2261 Financial Teller Terminals
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All Equip. Is Under NCR Maintenance.
For Information Call:
Carl Stephenson or Bill Neidert
(915)673-6451

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IDPS/IMOS $395 IRX $495
30 DAY TRIAL - $50
SOFTWARE PRODUCTS CO.
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Wichita, KS 67218
(316) 682-1762

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RX02-BA	$1,800
1123-AA	$4,000
TMB11-MA	3,500
Printronix P300	3,500
BA11-KE	1,800

Dick Montgomery
2358 Walsh Ave., Santa Clara, CA 95051
(408) 727-1113

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DL11-E	$ 395
DZ11-A	$1995
DZ11-B	$1500
DZ11-E	$3375
LP11-RA	$8500
MS11-MB	$1375
RH11-AB	$3750
RK05J/F	$ 875
RK07-EA	$5500

NEW YORK COMPUTER EXCHANGE
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Ask for BOB or HERB GRAND

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(2) RKO7 w/Controller
(1) LA-36
(1) LA-180
(1) DUP11
RSX-11-M Operating System
ALSO 2200VP SYSTEM
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(216) 292-3774

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11/70 1/2MB, MK11-CE	$2950
11/44 256KB, MS11MB	$1475
11/34 256KB, MS11LD	$1375
11/34 128KB, MS11LB	$965
11/23 MSV11DD mem	$385
DZ11 MUX Brd.	$1275
FP11A Fltng pt.	$1875

CALL RAY (617)275-6800

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Buena Park, Ca 90620
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For RSTS/E and RT-11
$1175
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(203) 735-1819

DONATE PDP 11/70
And Save More In Taxes Than You Will Obtain Through Resale Or Trade-in.
Write, Dean Kalogeras
WESTERN CT STATE
Administrative Computing
181 White St., Danbury, CT 06810
Or Call (203)797-4316
Brokers Welcome

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Systems • Processors • Memory
Options • Peripherals • Modules
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3200-9 Keller St., Santa Clara, CA 95050
(408)266-2545

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11/03 systems w/RL01 disk, LA180 printer, 64 KB memory, RT-11 license $4,500
RL01 disk packs $100
Complete packaged 11/23 systems with dual RL02, 256 KB, LA180 printer, VT101 $14,000
LA180 printers with interface & controller $650
DUV-11's $400
11/03 CPU's w/Fl. Pt. $300
Other Configurations CALL
E.E.C. Systems Inc.
(617)443-5106

TU77, TU78
MASTER TAPE DRIVES
VAX 11/780, 750, 730
W/Customized Software
ACCESS INT'L (617)367-5082

Call 1-800-343-6474 to place your ad

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FOR SALE OR LEASE
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(1) 7910R (1) 9895A
(1) 2649C (1) 3438A
(5) 9872 (3) HP85F
(2) 2631G (2) 3054DL
(4) 82905B (2) 59306A
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encore
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FOR SALE BY OWNER
COMPLETE HP 250 SYSTEM
1.2 meg Floppy, Basic Int, Image Data Base, Query-ad hoc reports, 128K OS & 64K user mem, (5) ports. 180 cps ptr, 16 Meg disk w/tape dr., A/P, G/L, A/R, O/E, I/C, SA, PR software.
DISCOUNTED
DELTA SOFTWARE SYSTEMS (513)229-2232
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WE BUY AND SELL
HP 3000 COMPUTERS
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Complete Systems, Memory, Terminals, Disk Drives, Tape Drives, Miscellaneous Parts.
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FINLEY & ASSOCIATES
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DATASOUTH - TELEVIDEO
MICRO-TERM - NEC - DEC
OEM PRICING AVAILABLE
For Further Information
(313)924-1020

DATA GENERAL

8600-N C/330 Eclipse 256KB	$7400
8611-K S/130 Eclipse 128KB	$6900
8448 C/300 Eclipse 256KB	$4500
8608-H NOVA 3/12 w/64KB	$2200
9208-M CS/40 Mod 5 20MB	$12,500
8703 512KB MV/8000 MOS	$4900
8656 256KB Eclipse MOS	$3900
6070 20MB Subsystem	$5500
4255 ALM-8	$1250
6108 D200	$1075

Data Investors (201) 838-7801

BUY	SELL	LEASE
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8656 256KB Eclipse Mem		$3,800
8387 256KB Nova 4 Mem		$3,000
8687 256KB S140 Mem		$3,200
6021 9-Track S/S		$4,800
6027 9-Track S/S		$6,500
6040 Dasher		$900
6089 LP2 Printer		$3,200
6053 D2 CRT		$1,350
6106 D100 CRT		$1,000
6061 192MB Disk S/S		$20,000
6061A 192MB Disk Add-On		$18,000
6061H 192MB Disk S/S		$21,500
6060 96MB Disk S/S		$18,000
6060A 96MB Disk Add-On		$15,500
6070A 20MB Disk Add-On		$3,800
8642 Burst Mux		$2,000
4251 Comm. Chassis		$1,100
4258 ALM-16 (8 Line)		$1,000
4218 300 LPM Printer		$4,000

Intl. Computing Systems (612)941-2941

MODEL CS 40
4-5 K Disc Packs
Printer
(2) Terminals
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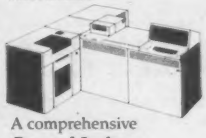

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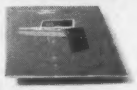

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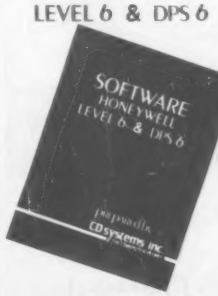

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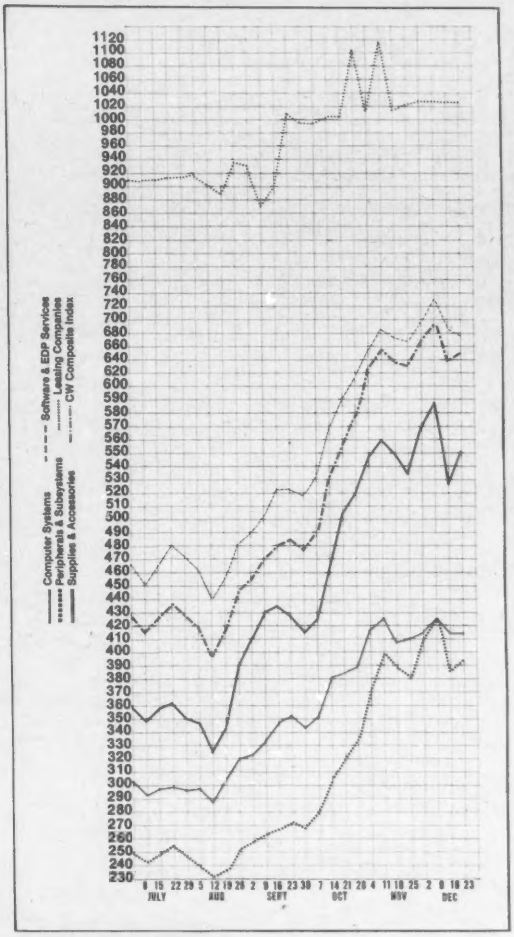

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Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, DECEMBER 22, 1982

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

E X C H		1981-82 RANGE (1)	CLOSE DEC 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	17- 35	27 3/4	- 5/8	-2.2
N	BURROUGHS CORP	28- 48	40	+ 5/8	+1.5
O	COMPUTER AUTOMATION	7- 17	15 7/8	+ 7/8	+5.8
N	CONTROL DATA CORP	21- 42	38 1/8	+1	+2.6
N	CRAY RESEARCH INC	20- 47	39 3/8	+1 7/8	+5.0
N	DATA GENERAL CORP	20- 58	38 1/4	+2 7/8	+7.8
N	DATAPOINT CORP	11- 34	18 1/2	+1 1/4	+7.2
N	DIGITAL EQUIPMENT	82-113	98 3/4	+1 3/4	+1.8
A	EECO INC	8- 11	8 1/8	- 5/8	-8.4
N	ELECTRONIC ASSOC.	5- 12	8 5/8	- 1/4	-2.5
N	FLOATING POINT SYST	16- 30	26 1/2	+1 3/8	+5.4
N	FOXBORO	22- 38	33 1/2	- 3/8	-1.1
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 8	8 1/8	+1 3/4	+40.0
N	HARRIS CORP	20- 43	38 1/4	+1 1/4	+3.3
N	HEWLETT-PACKARD CO	36- 82	75 1/2	+5	+7.0
N	HONEYWELL INC	60-104	88 1/8	+5 1/2	+6.3
N	IBM	48- 96	93 1/2	+4 1/8	+4.6
O	IPL SYSTEMS INC	5- 8	6 1/4	- 3/4	-10.7
O	MAGNUSON COMP SYSTS	2- 16	2 3/4	+ 1/8	+4.7
N	MANAGEMENT ASSIST	7- 18	10 1/4	- 1/8	-1.2
O	MINI-COMPUTER SYST	1- 4	5/8	+ 1/8	+25.0
N	MODULAR COMPUTER SYS	6- 13	11 1/8	- 1/4	-2.1
N	MOHAWK DATA SCI	10- 18	14	0	0.0
N	NCR	38- 85	87 1/4	+7 1/4	+9.0
N	PERKIN-ELMER	17- 32	27 1/4	+ 3/4	+2.8
N	PRIME COMPUTER INC	16- 38	35 1/2	+1 3/4	+5.1
N	SPERRY CORP	21- 37	31 7/8	+ 5/8	+2.0
O	TANDEM COMPUTERS INC	14- 34	26	+3 1/4	+14.2
N	TEXAS INSTRUMENTS	71-151	137 3/4	+8 3/4	+6.7
A	WANG LABS "B"	25- 63	55	+1 1/2	+2.8
A	WANG LABS "C"	21- 61	58	+4 3/4	+8.8
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	22- 28	26 3/4	0	0.0
N	COMDISCO INC	13- 35	34 5/8	+1 3/4	+5.3
B	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	3/8	0	0.0
O	CONTINENTAL INFO SYS	5- 20	10 5/8	+ 3/8	+3.6
N	DPF INC	5- 13	8 7/8	- 1/8	-1.3
O	ITEL	1- 3	1 1/2	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 37	34	-1 1/2	-4.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; B=BOSTON
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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E X C H		1981-82 RANGE (1)	CLOSE DEC 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 3/4	- 1/8	-6.6
O	ADVANCED SYSTEMS INC	9- 18	18 3/4	0	0.0
O	AGS COMPUTERS INC	7- 17	15 1/4	- 1/4	-1.6
N	ANACOMP INC	9- 18	16 1/2	+ 3/8	+2.3
O	ANALYSTS INTL CORP	5- 8	8	0	0.0
A	APPLIED DATA RES.	16- 42	38 3/8	+ 1/4	+0.6
O	ASK COMPUTER SYSTEMS	12- 27	22 3/8	+2 1/4	+11.1
B	ASTRADYNE COMP IND	1- 5	1 3/4	- 1/8	-6.6
N	AUTOMATIC DATA PROC	21- 37	35 3/8	+2 1/2	+7.6
O	CGA COMPUTER ASSOC	5- 8	8 3/4	+ 1/4	+2.9
O	COMPUTER ASSOC INT'L	12- 38	35 1/2	- 1/2	-1.3
O	COMPUTER HORIZONS	1- 3	7	- 1/4	-3.4
O	COMPUTER NETWORK	4- 8	7 1/4	- 1/8	-1.6
N	COMPUTER SCIENCES	11- 20	18 1/8	+ 1/2	+2.8
O	COMPUTER TASK GROUP	8- 18	13 3/4	+ 1/4	+1.8
O	COMPUTER USAGE	2- 5	3 3/4	+ 1/4	+7.1
O	COMPUTONE SYSTEMS	13- 30	28 1/4	+3 5/8	+14.7
O	COMSERV CORP	11- 20	16 3/4	0	0.0
O	CONSHARE	8- 10	9 5/8	+ 1/8	+1.2
N	CULLINANE DATABASE	24- 53	47 3/4	+ 3/4	+1.5
O	CYCARE SYSTEMS INC	9- 18	14 3/4	- 3/4	-4.8
O	DATA DIMENSIONS INC	1- 3	1/4	0	0.0
O	DATATAB	0- 4	3/8	- 1/8	-25.0
O	DYATRON CORP	2- 4	2 5/8	- 1/4	-8.6
N	ELECTRONIC DATA SYST	19- 50	45 3/4	+ 3/4	+1.6
O	INFORMATICS INC	10- 24	20 1/2	-1 3/8	-6.2
O	INSYTE CORP	1- 3	1 3/4	+ 1/8	+7.6
O	IPS COMPUTER MARKET.	1- 2	1 1/4	0	0.0
O	KEANE ASSOCIATES	4- 5	5 1/4	0	0.0
A	LOGICON	12- 28	27 5/8	+ 1/8	+0.4
O	MNGT SCI AMER INC	17- 42	18 3/4	-18	-48.9
O	MATHEMATICA INC	12- 18	13 1/4	-1 1/4	-7.5
O	MATHEMATICAL APP GRP	12- 18	13 1/2	-1	-6.8
O	NATIONAL DATA CORP	13- 28	22 3/4	0	0.0
O	PANSOPHIC SYSTEMS	8- 20	17 3/4	+ 1/2	+2.8
N	PLANNING RESEARCH	6- 11	10 1/8	+ 1/4	+2.5
O	PROGRAMMING & SYS	1- 3	2 7/8	+ 1/4	+9.5
O	REYNOLDS & REYNOLD	17- 28	27 1/2	+1	+3.7
O	SEI CORP	21- 45	40	+ 1/4	+0.6
O	SHARED MEDICAL SYST	26- 54	51 7/8	+1 1/8	+2.2
O	SCIENTIFIC COMPUTERS	8- 13	10 1/4	- 3/4	-6.8
O	SOFTWARE AG	5- 17	11 3/4	+ 1/4	+2.1
N	TYMSHARE INC	12- 30	17	-1 1/2	-8.1
A	URS CORP	10- 15	14 1/2	0	0.0
N	WYLY CORP	7- 13	8 1/8	-1 3/8	-13.0
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	1- 15	2 3/8	- 1/8	-7.3
A	ANDERSON JACOBSON	8- 26	23	0	0.0
O	AUTO-TROL TECHNOLOGY	8- 18	14	-1	-6.6
O	BANCTEC INC	7- 33	15	+2	+15.3
A	BEEHIVE INT'L	4- 9	8 7/8	+ 1/4	+2.8
A	BOLT,BERANEK & NEW	9- 34	32 3/4	3/8	-1.1
O	CAMBEX CORP	2- 4	2 1/8	+ 1/8	+6.2
N	CENTRONICS DATA COMP	6- 17	13 1/4	- 1/4	-1.8
A	CETEC CORP	4- 6	5 1/2	- 1/8	-2.2
O	COGNITRONICS	2- 8	8 1/4	+ 5/8	+11.1
O	COMPUTER COMMUN.	1- 2	3/4	0	0.0

E X C H		1981-82 RANGE (1)	CLOSE DEC 22 1982	WEEK NET CHNGE	WEEK PCT CHNGE
A	COMPUTER CONSOLES	15- 38	37 3/4	+3 1/8	+9.0
O	COMPUTER DEVICES INC	4- 21	10 3/4	- 1/8	-1.1
O	COMPUTER TRANSCEIVER	4- 7	6 1/8	- 1/4	-3.9
N	COMPUTERVISION CORP	19- 38	30	+1 1/8	+4.3
N	CONRAC CORP	21- 35	32 1/4	- 5/8	-1.9
A	DATA ACCESS SYSTEMS	2- 5	1 1/4	0	0.0
A	DATAPRODUCTS CORP	16- 35	32 1/8	+1 5/8	+5.3
A	DATARAM CORP	5- 10	9 3/8	+ 1/8	+1.3
O	DATUM INC	2- 5	4 1/4	+ 5/8	+17.2
O	DAVID JAMISON CARLYL	2- 7	3 3/4	0	0.0
O	DECISION DATA COMPUT	3- 14	12 1/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	2 3/4	0	0.0
N	ELECTRONIC M & M	5- 8	6 5/8	+ 3/8	+6.0
O	EVANS & SUTHERLAND	18- 48	42 1/2	- 7/8	-2.0
O	GANDALF TECHNOLOGIES	10- 22	16 5/8	+1 5/8	+10.8
N	GEN'L DATA COMM IND	6- 18	17 1/2	0	0.0
O	GENERAL TERMINAL CP	0- 4	1/2	0	0.0
O	GREAT SOUTHWEST IND	3- 8	2 1/2	0	0.0
N	HAZELTINE CORP	22- 43	38 5/8	- 3/8	-0.9
O	ICOT CORP	3- 9	8 1/8	+ 3/8	+4.8
O	INFORMATION INTL INC	10- 22	19 3/4	+ 3/4	+3.9
O	INTEL CORP	21- 42	38 1/2	+4 3/4	+13.6
O	IPL SYSTEMS INC	5- 8	6 1/4	- 3/4	-10.7
A	LUNDY ELECTRONICS	7- 14	12	0	0.0
A	MSI DATA CORP	14- 28	28	+3 1/8	+12.5
O	NETWORK SYSTEMS CORP	15- 38	34 1/2	+3 1/2	+11.2
O	OMEX	2- 8	3	0	0.0
N	PARADYNE CORP	24- 50	37 1/4	-4 5/8	-11.0
A	PENRIL CORP	7- 12	9 3/4	- 1/8	-1.2
O	RAMTEK CORP	12- 20	14 1/2	- 3/4	-4.9
N	RECOGNITION EQUIP	4- 10	8 7/8	+ 1/2	+5.9
O	SCAN DATA	1- 5	1 1/4	- 1/4	-16.6
N	STORAGE TECHNOLOGY	16- 40	21 1/4	- 1/2	-2.2
O	SYKES DATATRONICS	6- 34	10 1/8	+ 1/4	+2.5
A	T BAR INC	7- 11	9	+ 7/8	+10.7
A	TEC INC	6- 12	10 7/8	+ 1/4	+2.3
N	TEKTRONIX INC	34- 61	58 1/4	+1 1/4	+2.2
N	TELEX	9- 27	23 1/8	+1 5/8	+7.5
O	TESDATA SYSTEMS CP	3- 10	6	0	0.0
A	TIMEPLEX INC	7- 18	17 3/4	+1 3/4	+10.9
O	VISUAL TECHNOLOGY	9- 17	15 1/4	+1 3/4	+12.8
O	WILTEK INC	1- 3	1 3/8	- 1/8	-8.3
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 18	17	+ 1/2	+3.0
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	13- 22	22 1/4	0	0.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
A	DUPLEX PRODUCTS INC	12- 20	17 1/4	-1 1/2	-8.0
N	ENNIS BUS. FORMS	18- 30	25 1/4	-3 3/4	-12.9
N	IM COMPANY	48- 78	74	+3 7/8	+5.5
N	MOORE CORP LTD	28- 41	41 1/4	+ 7/8	+2.1
N	NASHUA CORP	9- 18	12 1/8	- 1/8	-2.0
O	STANDARD REGISTER	32- 72	70	0	0.0
A	TAB PRODUCTS CO	12- 24	23 7/8	+2 1/4	+10.4
N	WALLACE BUS FORMS	22- 50	45 1/4	+ 3/4	+1.6

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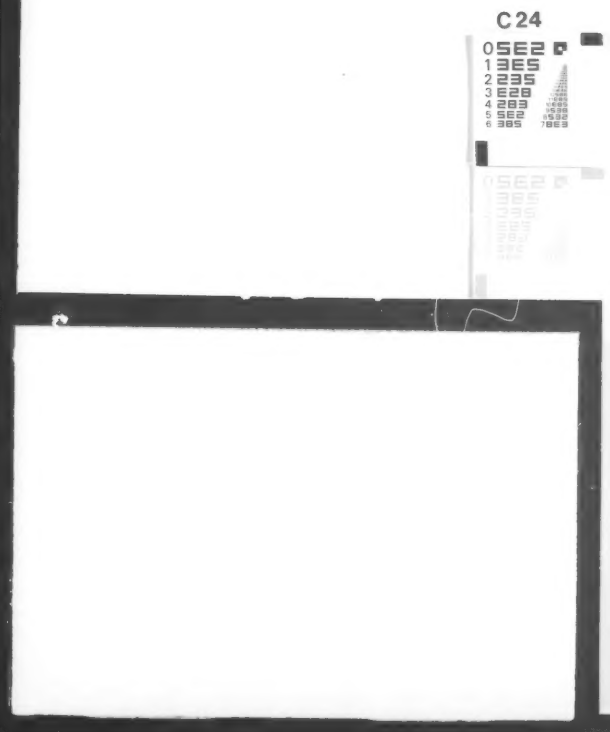
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